



MONITORING YEAR 0 ANNUAL REPORT FINAL

May 2022

DYNAMITE CREEK MITIGATION SITE

Rockingham County, NC
Roanoke River Basin
HUC 03010103

DMS Project No. 100125
NCDEQ Contract No. 7911
DMS RFP No. 16-007727
NCDWR Project No. 2019-0868
USACE Action ID No. 2019-00909
Data Collection Dates: November 2021 - January 2022

PREPARED FOR:



NC Department of Environmental Quality Division of Mitigation Services

1652 Mail Service Center
Raleigh, NC 27699-1652



May 13, 2022

Jeremiah Dow

NC DEQ Division of Mitigation Services
217 West Jones Street
Raleigh, NC 27603

Subject: DMS Comments on Dynamite Creek Mitigation Site Monitoring Year 0 Report
DMS Project Number 100125
Rockingham County, North Carolina
Contract No. 7911

Dear Mr. Dow,

We have reviewed the comments on the MY0 Report for the above referenced project dated April 11, 2022. Below are responses to each of the comments. For your convenience, the comments are reprinted with responses in italics.

1. Table 1 footnote says that Reach 5 “footage is less than projected” when it should indicate that the as-built length is more than projected.

The typo has been corrected and now reads “footage is more than projected.”

2. In the drawings some of the alignment changes appear to be minor enough to not require a callout. For example, the alignment deviations on Sheet 1.3 likely do not need called out. Please update Section 2 of the reports as needed.

The minor alignment deviation callouts have been removed and Section 2 of the report has been updated accordingly.

3. Please ensure that red-line callouts are consistent. For example, on Sheet 1.6 the structures that were added should be colored red and do not need the “cloud” callout bubble. Recommend the callout bubble be reserved only for structures that were not installed or installed but not located. Likewise, on sheet 1.7, the brush toe added at Station 126+32 is correctly colored red, but does not need the callout bubble.

Red-line callouts were adjusted to be consistent and call out bubbles are now used on only structures that were not installed or installed but not located.



4. Sheets 1.13 & 1.14 do not appear to show an “as-designed bankfull” line. This would also assist in determining if some of the alignment callouts could be removed or should be left in the report.

The work on City and Village Creeks on Sheets 1.13 and 1.14 included stabilization along existing alignment. A full set of design parameters were not needed and design plans did not include a designed bankfull line. As such, the as-built plans also do not have an “as-designed bankfull” line. Alignment callouts were left as is.

If you have any questions, please contact me by phone (919) 851-9986, or by email (jlorch@wildlandseng.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Jason Lorch".

Jason Lorch, Monitoring Coordinator

PREPARED BY:



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DYNAMITE CREEK MITIGATION SITE
Monitoring Year 0 Annual Report

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Section 1: PROJECT OVERVIEW

The Dynamite Creek Mitigation Site (Site) is located in Rockingham County, approximately three miles east of the City of Eden. The site includes two unnamed tributaries (Dynamite Creek and UT1) draining to Town Creek, which drains to the Dan River, and subsequently the Roanoke River. The project streams are surrounded by forested land on the upper reaches and a cattle farm on the lower reaches. It is included in the Eden Area Watershed Restoration Plan (EAWRP) which identifies sediment, fecal coliform bacteria, and nutrients as the main water quality and habitat stressors. The Restoration Watershed S-09 in the EAWRP includes the Site and identifies the area as a significant source of bacteria loading from livestock. Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

Mitigation work within the Site included restoration, enhancement I, and preservation of perennial and intermittent stream channels along with wetland rehabilitation and reestablishment. Table 1 below shows stream credits by reach, wetland credits by type, and credit totals expected by project closeout.

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Footage	As-Built Footage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits ¹	Comments
Stream							
Dynamite Creek R1	498	498	Warm	P	10.0	49.800	Conservation Easement
Dynamite Creek R2	361	356	Warm	R	1.0	361.000	Full Channel Restoration
	30	30	N/A	N/A	0.0	N/A	Easement Break
	359	362	Warm	R	1.0	359.000	Full Channel Restoration
Dynamite Creek R3	155	158	Warm	R	1.0	155.000	Full Channel Restoration
Dynamite Creek R4	522	522	Warm	P	10.0	52.200	Conservation Easement
Dynamite Creek R5	555	610	Warm	E1	1.5	370.000	Pattern and Bank Stabilization, Conservation Easement
Dynamite Creek R6	656	651	Warm	R	1.0	656.000	Full Channel Restoration
	22	22	N/A	N/A	0.0	N/A	Internal Crossing
Dynamite Creek R7	1,570	1,563	Warm	R	1.0	1,570.000	Full Channel Restoration
UT1	287	287	Warm	P	10.0	28.700	Conservation Easement
Total:						3,601.700	

¹A light touch approach was used on Dynamite Creek Reach 5, only short sections of work were done without full design parameters. As-Built footage is more than projected because it was not necessary to move Reach 5 as much as anticipated to stabilize it. Credits are calculated using Mitigation Plan Footage.

PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Acreage	As-Built Acreage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
Wetland							
Wetland Rehabilitation	5.475	5.475	Riverine	Rehabilitation	1.5	3.650	
Wetland Reestablishment	5.541	5.541	Riverine	Reestablishment	1.0	5.541	
Total:						9.191	

Restoration Level	Stream	Riparian Wetland
	Warm	Riverine
Restoration	3,101.000	
Enhancement I	370.000	
Enhancement II		
Preservation	130.700	
Re-Establishment		5.541
Rehabilitation		3.650
Enhancement		
Creation		
Total Credits	3,601.700	9.191

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits. Table 2 below describes expected outcomes to water quality and ecological processes and provides project goals and objectives.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Exclude livestock from streams.	Install fencing around the conservation easement adjacent to livestock pastures.	Reduction in sediment, nutrient, and fecal coliform bacteria inputs through livestock exclusion.	Prevent encroachment by livestock.	Visually inspect the perimeter of the site to ensure no livestock access is occurring.	No livestock access to the conservation easement has occurred.

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time. Repair eroding stream banks with bioengineering methods. Restore profile to remove dam breach headcut.	Reduce shear stress on channel boundary. Reduce sediment inputs from bank erosion.	Entrenchment ratio over 2.2 for C/E or 1.4 for B restoration reaches and bank height ratio below 1.2 with visual assessments showing progression towards stability.	Cross-section data will be collected during MY1, MY2, MY3, MY5, and MY7 and visual inspections will be performed annually.	Cross-sections show streams are stable and functioning as designed. ERs are over 2.2 and BHRs are below 1.2.
Improve instream habitat.	Install habitat features such as constructed riffles, cover logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians leading to colonization and increase in biodiversity over time. Add complexity including LWD to the streams.	There is no required performance standard for this metric.	N/A	N/A
Reconnect channels with floodplains.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Allow more frequent flood flows to disperse on the floodplain. Improve wetland hydrology on Dynamite Creek Reach 7.	Four bankfull events in separate years within monitoring period.	Crest gauge and/or pressure transducer recording flow elevations.	Data will be collected throughout the year and reported in MY1.
Improve wetland hydrology.	Remove livestock to allow soil profiles to stabilize. Remove drain effect of channelized stream and floodplain berms and swales.	Increased surface water residency time will provide contact treatment and groundwater recharge potential.	Free groundwater table within 12 inches of the ground surface for 12% of the growing season.	Groundwater gauges recording water table elevation.	Data will be collected throughout the year and reported in MY1.
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks. Treat invasive species within project area.	Reduce sediment inputs from bank erosion and runoff. Increase nutrient cycling and storage in floodplain. Provide riparian habitat. Add a source of LWD and organic material to stream.	210 planted stems per acre at MY7. Interim survival rate of 320 planted stems per acre at MY3 and 260 at MY5. Trees in each plot must average 7 ft at MY5 and 10 ft at MY7.	One hundred square meter vegetation plots are placed on 2% of the planted area of the Site. Data will be collected during MY1, MY2, MY3, MY5, and MY7 and visual inspections will be performed annually.	All 13 vegetation plots have a planted stem density greater than 320 stems per acre.



Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Permanently protect the project Site from harmful uses.	Establish a conservation easement on the site. Preserve high quality stream reaches through the placement of a conservation easement on site.	Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No easement encroachments.

1.3 Project Attributes

The Site consists of streams on lands which are forested along the upland reaches and which have been historically farmed along the lower reaches on the greater Dan River floodplain. Trees on the hilltops east of project streams were logged in 2007 but the area is nearly entirely reforested. The project includes two perennial streams, Dynamite Creek and UT1, as well as three not for credit intermittent streams. Dynamite Creek begins at a headcut and is buffered by mature hardwood forest, it flows through a powerline easement, a relic dam, and was situated against valley walls causing erosion. As Dynamite Creek flows out of the forest and onto the Dan River floodplain, it previously flowed through an online pond and open cattle pasture. Cattle had full access to the pond and stream, which was dredged by the farmer approximately every ten years. UT1 flows through mature hardwood forest to its confluence with Dynamite Creek in Reach 4. Aerial photography shows land use and riparian buffer extents have remained essentially unchanged since at least 1951. Table 3 below and Table 8 in Appendix C present additional information on pre-restoration conditions.

Table 3: Project Attributes

PROJECT INFORMATION				
Project Name	Dynamite Creek Mitigation Site	County	Rockingham County	
Project Area (acres)	22.9	Project Coordinates	36°29'3.32"N, 79°42'39.31"W	
PROJECT WATERSHED SUMMARY INFORMATION				
Physiographic Province	Piedmont	River Basin	Roanoke River	
USGS HUC 8-digit	03010103	USGS HUC 14-digit	03010103230040	
DWR Sub-basin	03-02-2003	Land Use Classification	75% forested; 21.5% managed herbaceous cover/pasture; 2.5% shrubland; 1% developed	
Project Drainage Area (acres)	119	Percentage of Impervious Area	0.5%	
RESTORATION TRIBUTARY SUMMARY INFORMATION				
Parameters	Dynamite Creek			
	Reach 2	Reach 3	Reach 6	Reach 7
Pre-project length (feet)	947	206	703	1,376
Post-project (feet)	748	158	673	1,563
Valley confinement	Confined		Unconfined	
Drainage area (acres)	35	36	75	119

RESTORATION TRIBUTARY SUMMARY INFORMATION				
Parameters	Dynamite Creek			
	Reach 2	Reach 3	Reach 6	Reach 7
Perennial, Intermittent, Ephemeral	Perennial			
DWR Water Quality Classification	C			
Dominant Stream Classification (existing)	E4	C4	E4	C5
Dominant Stream Classification (proposed)	B4/C4	B4/C4	C4	C4/E4
Dominant Evolutionary class (Simon) if applicable	Stage III/IV		Stage IV	
REGULATORY CONSIDERATIONS				
Parameters	Applicable?	Resolved?	Supporting Documentation	
Water of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No. 27 and DWQ 401 Water Quality Certification No. 4134.	
Water of the United States - Section 401	Yes	Yes		
Endangered Species Act	Yes	Yes	Categorical Exclusion in Mitigation Plan (Wildlands, 2021)	
Historic Preservation Act	Yes	Yes		
Coastal Zone Management Act (CZMA or CAMA)	No	No	N/A	
Essential Fisheries Habitat	No	N/A	N/A	

Section 2: As-Built Condition (Baseline)

Site construction and as-built surveys were completed in November and December 2021 respectively. The survey included developing an as-built topographic surface; as well as, surveying the as-built channel centerlines, top of banks, structures, and cross-sections.

2.1 As-Built/Record Drawings

A sealed half-size set of record drawings are in Appendix E which includes the post-construction survey, alignments, structures, and monitoring features. Dynamite Creek Reach 5 was designed to be a light touch enhancement approach with the focus on repairing meander bends. Two areas were proposed for re-alignment in order to repair bends. The bends were able to be repaired without re-aligning the adjacent riffles. Stream credits are presented based on the alignment proposed in the mitigation plan. Minimal adjustments were made during construction, where needed, based on field evaluations, and are listed below.

2.1.1 Dynamite Creek – Upstream of Conservation Easement

- STA 100+52 – 100+95 – Bank Pins located on site showed no signs of active erosion over several years. Wildlands chose not to grade area with approval from DMS.

2.1.2 Dynamite Creek Reach 2

- STA 110+39 – 110+57 – Log sill and soil lift installed but not located.
- STA 111+09 – Valley sill installed but not located.
- STA 111+94 – 112+55 – Riffle added to stabilize upstream and downstream of ford crossing.
- STA 113+20 – 116+35 – Dynamite Creek alignment changed due to GPS error because of dense tree canopy.
- STA 113+49 – Valley sill installed but not located.
- STA 114+26 – Valley sill installed but not located.

2.1.3 Dynamite Creek Reach 3

- STA 116+72 – 117+43 – Dynamite Creek alignment changed due to GPS error because of dense tree canopy.
- STA 117+18 – 117+24 – Brush toe added to fully stabilize outer bend.

2.1.4 Dynamite Creek Reach 5

- STA 123+01 – 123+18 – Brush toe and cover log installed but not located.
- STA 124+01 – 124+08 – Boulder toe replaced with brush toe because of lack of local material availability.
- STA 124+17 – 124+30 and STA 125+18 – 125+34 – Riffles not installed because the channel was not realigned.
- STA 124+29, STA 125+35, and STA 125+59 – Log sills not installed to save existing trees and reduce overall impact.
- STA 124+35 – 124+83 and STA 125+36 – 125+80 - Dynamite Creek Reach 5 was designed to be a light touch enhancement approach with the focus on repairing meander bends. Two areas were proposed for re-alignment in order to repair bends. The bends were able to be repaired without re-aligning the adjacent riffles. Stream credits are presented based on the original design alignment in the mitigation plan.
- STA 124+48 – 124+56 – Brush toe relocated to protect mature trees along streambank.
- STA 124+65 – 124+84 – Riffle not installed due to a natural woody grade already being present.



- STA 125+37 – 125+66 – Brush toe added to protect bend that had eroded since mitigation plan.
- STA 125+45 – 125+60 – Alignment adjusted during repair of eroded bank to reduce stress on outer bend.
- STA 126+32 – 126+48 – Brush toe added to protect bend that had eroded since mitigation plan.
- STA 128+20 – 128+43 – Riffle not constructed. Existing riffle was stable.

2.1.5 Dynamite Creek Reach 6

- STA 130+12 – 130+32 – Added cover log to brush toe to reduce amount of brush needed. Limited native brush available.
- STA 130+53 – 130+63 – Replaced brush toe with a cover log to reduce amount of brush needed. Limited native brush available.
- STA 133+21 – Valley sill installed but not located.

2.1.6 Dynamite Creek Reach 7

- STA 139+56 – 139+75 – Added cover log to brush toe to reduce amount of brush needed. Limited native brush available.
- STA 149+18 – 149+59 – Soil lift replaced with brush toe. Cross-section was not deep enough to accommodate a soil lift.



Section 3: Monitoring Year 0 Data Assessment

Annual monitoring and site visits were conducted during MY0 to assess the condition of the project. The vegetation and stream success criteria for the Site follow the approved success criteria presented in the Mitigation Plan (Wildlands, 2021). Performance criteria for vegetation, stream, and hydrologic assessment are located in Section 1.2 Table 3: Goals, Performance Criteria, and Functional Improvements.

3.1 Vegetative Assessment

The MY0 vegetative survey was completed in January 2022. Vegetation monitoring resulted in a stem density range of 526 to 729 planted stems per acre across vegetation plots which is well above the interim requirement of 320 stems per acre required at MY3. Average stem density across vegetation plots is 595 planted stems per acre. All 13 vegetation plots exceeded the interim success criteria individually and are on track to meet the final success criteria required for MY7. Herbaceous vegetation is establishing itself across the site. Refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix B for Vegetation Plot Data.

3.2 Vegetation Areas of Concern

There are currently no vegetation areas of concern. Invasive species are not pervasive at the Site. While small, scattered populations of multiflora rose (*Rosa multiflora*), Chinese privet (*Ligustrum sinense*), and Japanese spiraea (*Spiraea japonica*) were present on the floodplain along Dynamite Creek Reach 7 before construction, much was removed during construction. Wildlands recognizes that multiple treatments are typically needed for effective invasive plant control. The Site will be monitored and treated as necessary.

3.3 Stream Assessment

Morphological surveys for MY0 were completed in December 2021. All streams on Site are stable and functioning as designed. Streams show minor deviations from design and visual assessments following construction indicate that streams remain stable. Cross-sections show entrenchment and width-to-depth ratios within an acceptable range of the design parameters, and bank height ratios are less than 1.2. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.

3.4 Stream Areas of Concern

No stream areas of concern were identified at this time.

3.5 Hydrology Assessment

One crest gauge was installed on Reach 6 of Dynamite Creek. Hydrologic data will be collected and reported during MY1.

3.6 Wetland Assessment

Ten groundwater gauges and one soil temperature probe were installed across wetland areas. Groundwater gauge data will be collected and reported during MY1.

3.7 Adaptive Management Plan

No adaptive management plans are needed at this time.



3.8 Monitoring Year 0 Summary

Overall, the Site looks great, is performing as intended, and is on course to meet success criteria. Vegetation plot data shows an average density of 595 planted stems per acre across vegetation plots. All plots are on track to exceed the MY3 interim requirement of 320 planted stems per acre. All project streams are stable, functioning as intended, and meeting project goals. Herbaceous vegetation is establishing itself across the site and the floodplain is stable. Stream and wetland hydrology data will be included in the MY1 annual report. Invasive species are not currently a concern, but they will be assessed and treated as necessary in future monitoring years.

Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. All raw data supporting the tables and figures in the appendices are available from DMS upon request.



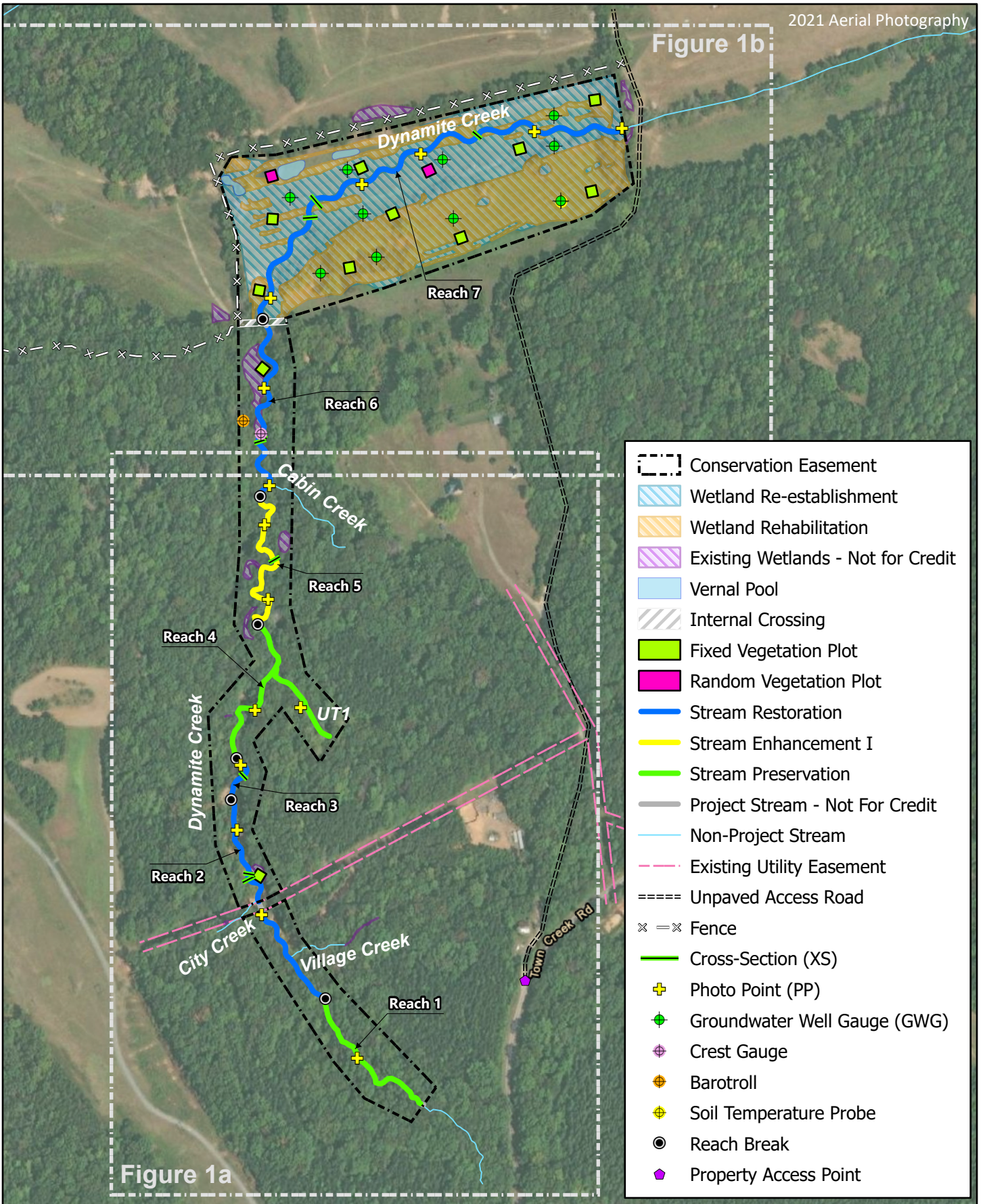
Section 4: METHODOLOGY

Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using Pathfinder and ArcPro. Pressure transducers were installed in riffle cross-sections and monitored throughout the year. Hydrologic monitoring instrument installation and monitoring methods are in accordance with the United States Army Corps of Engineers standards (USACE, 2003) and the North Carolina Interagency Review Team Stream and Wetland Compensatory Mitigation Update (NCIRT, 2016). Vegetation monitoring protocols followed the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008).

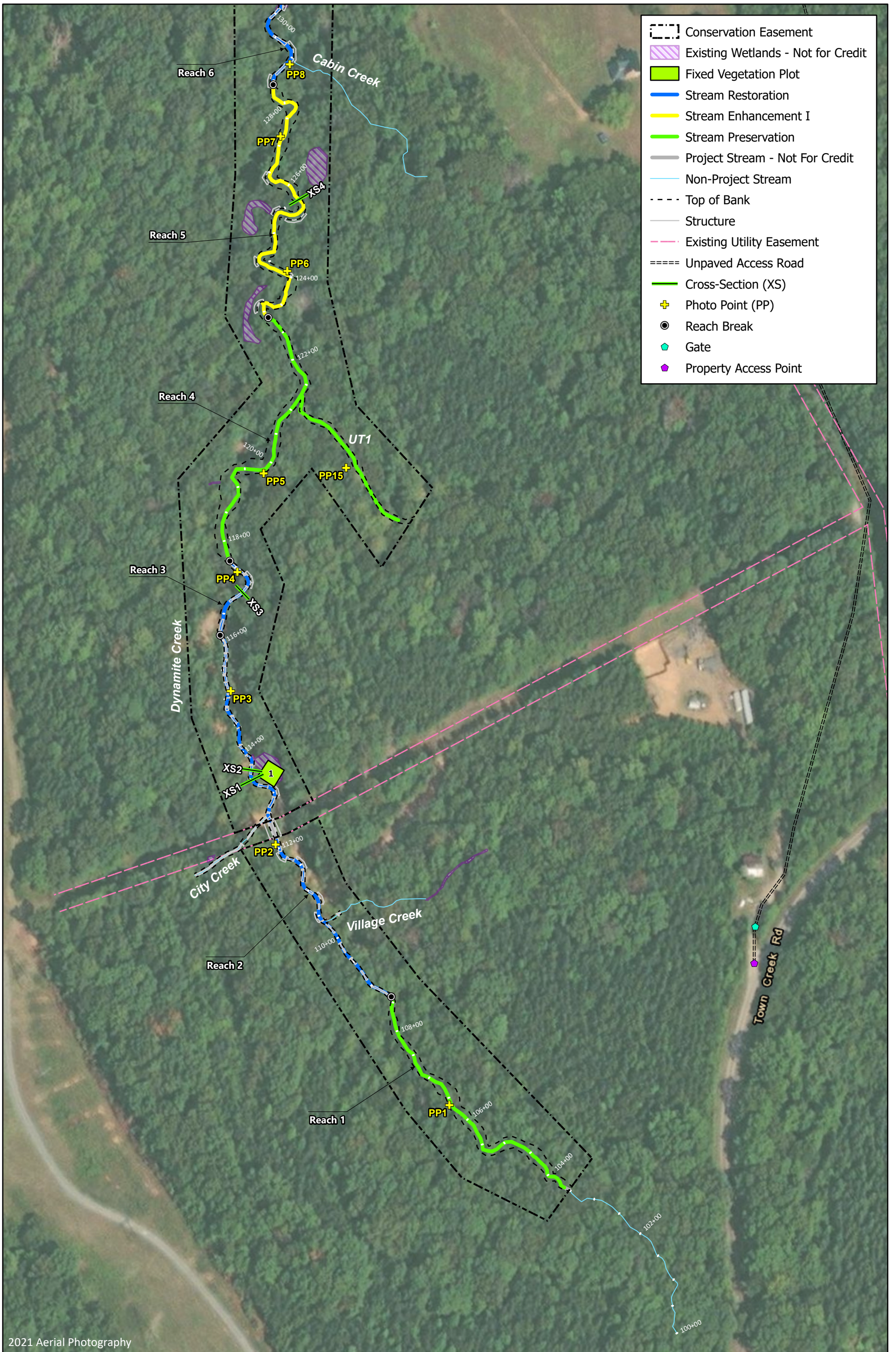
Section 5: REFERENCES

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Figure 1b



- Conservation Easement
- Wetland Re-establishment
- Wetland Rehabilitation
- Existing Wetlands - Not for Credit
- Vernal Pool
- Internal Crossing
- Fixed Vegetation Plot
- Random Vegetation Plot
- Stream Restoration
- Stream Enhancement I
- Stream Preservation
- Project Stream - Not For Credit
- Non-Project Stream
- Existing Utility Easement
- Unpaved Access Road
- Fence
- Cross-Section (XS)
- Photo Point (PP)
- Groundwater Well Gauge (GWG)
- Crest Gauge
- Barotroll
- Soil Temperature Probe
- Reach Break
- Property Access Point



2021 Aerial Photography



0 150 300 Feet



Figure 1a. Current Condition Plan View Map
 Dynamite Creek Mitigation Site
 DMS Project No. 100125
 Monitoring Year 0 -2022
 Rockingham County, NC

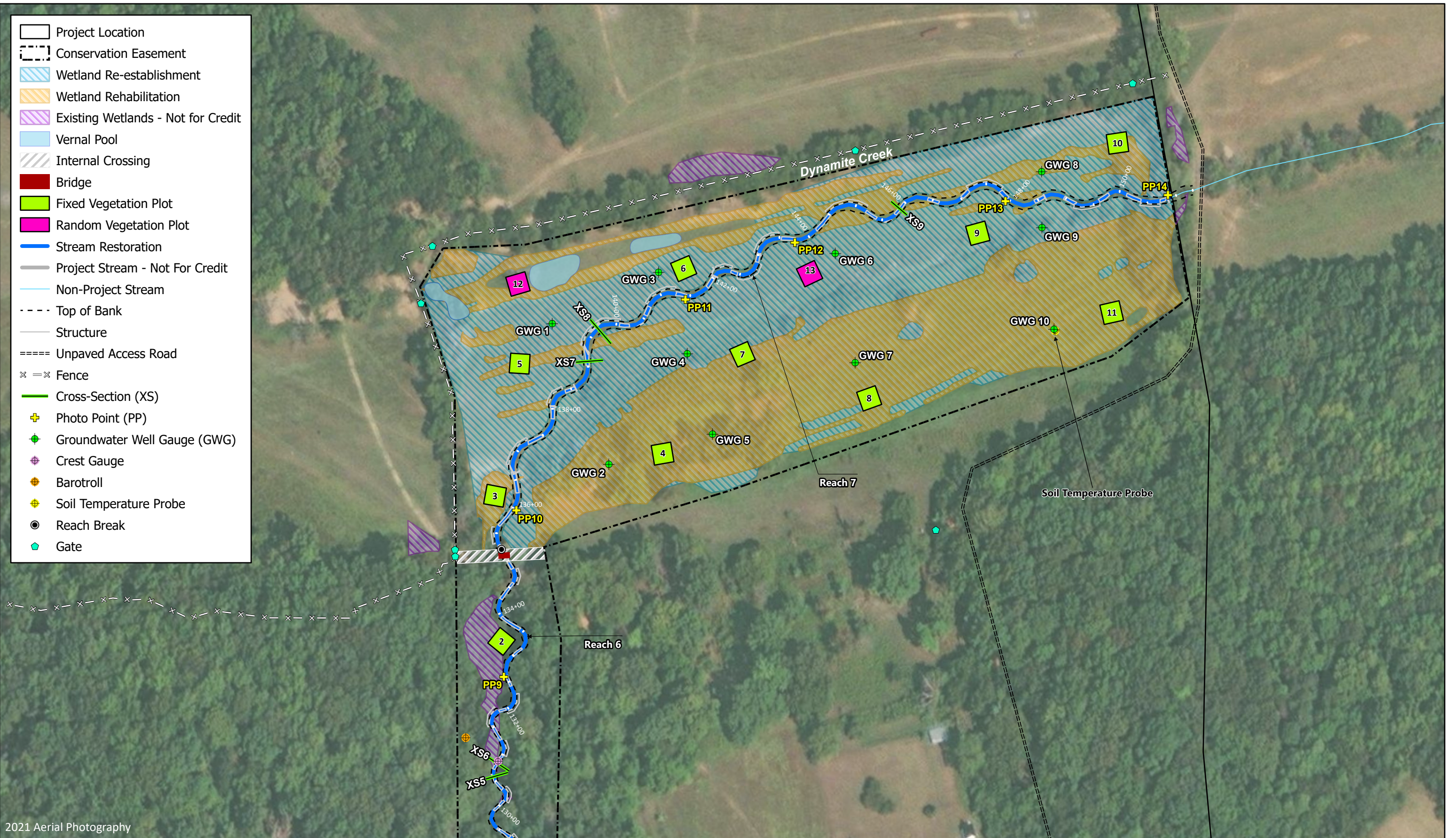


Figure 1b. Current Condition Plan View Map
 Dynamite Creek Mitigation Site
 DMS Project No. 100125
 Monitoring Year 0 - 2022
 Rockingham County, NC

APPENDIX A. VISUAL ASSESSMENT DATA

Table 4. Visual Stream Morphology Stability Assessment Table

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 2 and 3

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	876
					Assessed Bank Length	1,752
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	0
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	24	24		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	5	5		100%

Dynamite Creek Reach 5

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	610
					Assessed Bank Length	1,220
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	0
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0		N/A
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	6	6		100%

Table 4. Visual Stream Morphology Stability Assessment Table

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 6 and 7

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	2,214
					Assessed Bank Length	4,428
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	0
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	20	20		100%

Table 5. Vegetation Condition Assessment Table

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Planted Acreage 15.40

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
Total			0	0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
Cumulative Total			0.0	0%

Easement Acreage 22.92

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Invasive species included in summation above should be identified in report summary.	0.10	0	0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	0 Encroachments Noted / 0 ac	

STREAM PHOTOGRAPHS



PHOTO POINT 1 Dynamite Creek R1 – upstream (11/03/2021)



PHOTO POINT 1 Dynamite Creek R1 – downstream (11/03/2021)



PHOTO POINT 2 Dynamite Creek R2 – upstream (11/03/2021)



PHOTO POINT 2 Dynamite Creek R2 – downstream (11/03/2021)



PHOTO POINT 3 Dynamite Creek R2 – upstream (11/03/2021)



PHOTO POINT 3 Dynamite Creek R2 – downstream (11/03/2021)





PHOTO POINT 4 Dynamite Creek R3 – upstream (11/03/2021)



PHOTO POINT 4 Dynamite Creek R3 – downstream (11/03/2021)



PHOTO POINT 5 Dynamite Creek R4 – upstream (11/03/2021)



PHOTO POINT 5 Dynamite Creek R4 – downstream (11/03/2021)



PHOTO POINT 6 Dynamite Creek R5 – upstream (11/03/2021)



PHOTO POINT 6 Dynamite Creek R5 – downstream (11/03/2021)





PHOTO POINT 7 Dynamite Creek R5 – upstream (11/03/2021)

PHOTO POINT 7 Dynamite Creek R5 – downstream (11/03/2021)



PHOTO POINT 8 Dynamite Creek R6 – upstream (11/03/2021)

PHOTO POINT 8 Dynamite Creek R6 – downstream (11/03/2021)



PHOTO POINT 9 Dynamite Creek R6 – upstream (11/03/2021)

PHOTO POINT 9 Dynamite Creek R6 – downstream (11/03/2021)





PHOTO POINT 10 Dynamite Creek R7 – upstream (11/04/2021)



PHOTO POINT 10 Dynamite Creek R7 – downstream (11/04/2021)



PHOTO POINT 11 Dynamite Creek R7 – upstream (11/04/2021)



PHOTO POINT 11 Dynamite Creek R7 – downstream (11/04/2021)



PHOTO POINT 12 Dynamite Creek R7 – upstream (11/04/2021)



PHOTO POINT 12 Dynamite Creek R7 – downstream (11/04/2021)





PHOTO POINT 13 Dynamite Creek R7 – upstream (11/04/2021)

PHOTO POINT 13 Dynamite Creek R7 – downstream (11/04/2021)



PHOTO POINT 14 Dynamite Creek R7 – upstream (11/04/2021)

PHOTO POINT 14 Dynamite Creek R7 – downstream (11/04/2021)



PHOTO POINT 15 UT1 – upstream (11/03/2021)

PHOTO POINT 15 UT1 – downstream (11/03/2021)



VEGETATION PLOT PHOTOGRAPHS



FIXED VEG PLOT 1 (01/28/2022)



FIXED VEG PLOT 2 (01/28/2022)



FIXED VEG PLOT 3 (01/28/2022)



FIXED VEG PLOT 4 (01/28/2022)



FIXED VEG PLOT 5 (01/28/2022)



FIXED VEG PLOT 6 (01/28/2022)





FIXED VEG PLOT 7 (01/28/2022)



FIXED VEG PLOT 8 (01/28/2022)



FIXED VEG PLOT 9 (01/28/2022)



FIXED VEG PLOT 10 (01/28/2022)



FIXED VEG PLOT 11 (01/28/2022)





RANDOM VEG PLOT 12 (01/28/2022)



RANDOM VEG PLOT 13 (01/28/2022)



BRIDGE PHOTOGRAPHS



Dynamite Creek R7 - Looking Upstream (11/03/2021)



Dynamite Creek R6 - Looking Downstream (11/03/2021)



APPENDIX B. VEGETATION PLOT DATA

Table 6. Vegetation Plot Data

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Planted Acreage	15.40
Date of Initial Plant	2022-01-11
Date of Current Survey	2022-01-28
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC	2	2	2	2	1	1	2	2
	<i>Alnus serrulata</i>	hazel alder	Tree	FACW					2	2		
	<i>Betula nigra</i>	river birch	Tree	FACW	3	3	1	1	2	2	1	1
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW			1	1	1	1	1	1
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	4	4	2	2	2	2
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL			1	1			1	1
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW	1	1					3	3
	<i>Salix nigra</i>	black willow	Tree	OBL	2	2	1	1	1	1	2	2
	<i>Salix sericea</i>	silky willow	Shrub	OBL	2	2	2	2			1	1
	<i>Sambucus canadensis</i>	American black elderberry	Tree						2	2	1	1
	<i>Ulmus americana</i>	American elm	Tree	FAC			1	1	2	2	2	2
	<i>Ulmus rubra</i>	slippery elm	Tree	FAC					2	2		
Sum	Performance Standard				13	13	13	13	15	15	16	16
Mitigation Plan Performance Standard	Current Year Stem Count					13		13		15		16
	Stems/Acre					526		526		607		648
	Species Count					6		8		9		10
	Dominant Species Composition (%)					23		31		13		19
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					13		13		15		16
	Stems/Acre					526		526		607		648
	Species Count					6		8		9		10
	Dominant Species Composition (%)					23		31		13		19
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 6. Vegetation Plot Data

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Planted Acreage	15.40
Date of Initial Plant	2022-01-11
Date of Current Survey	2022-01-28
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC	2	2	1	1	1	1	1	1
	<i>Alnus serrulata</i>	hazel alder	Tree	FACW	2	2			1	1	1	1
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	2	2	2	2	4	4
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW	2	2						
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW			3	3	3	3		
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL			1	1	2	2	1	1
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW								
	<i>Salix nigra</i>	black willow	Tree	OBL	1	1	2	2	2	2	1	1
	<i>Salix sericea</i>	silky willow	Shrub	OBL	1	1	4	4	1	1	1	1
	<i>Sambucus canadensis</i>	American black elderberry	Tree		2	2	3	3	2	2	1	1
	<i>Ulmus americana</i>	American elm	Tree	FAC	2	2	1	1			4	4
	<i>Ulmus rubra</i>	slippery elm	Tree	FAC			1	1	1	1	1	1
Sum	Performance Standard				14	14	18	18	15	15	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					14		18		15		15
	Stems/Acre					567		729		607		607
	Species Count					8		9		9		9
	Dominant Species Composition (%)					14		22		20		27
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					14		18		15		15
	Stems/Acre					567		729		607		607
	Species Count					8		9		9		9
	Dominant Species Composition (%)					14		22		20		27
	Average Plot Height (ft.)					2		2		2		2
	% Invasives					0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 6. Vegetation Plot Data

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Planted Acreage	15.40
Date of Initial Plant	2022-01-11
Date of Current Survey	2022-01-28
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 R	Veg Plot 13 R
					Planted	Total	Planted	Total	Planted	Total	Total	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC	1	1	1	1	2	2	2	1
	<i>Alnus serrulata</i>	hazel alder	Tree	FACW	1	1	1	1			1	
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	2	2	2	2	1	2
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW	1	1	1	1	2	2	1	
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	1	1	4	4	2	2
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL	1	1	1	1				1
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW	1	1	1	1				3
	<i>Salix nigra</i>	black willow	Tree	OBL	2	2	1	1	1	1	1	1
	<i>Salix sericea</i>	silky willow	Shrub	OBL	2	2	1	1	1	1	1	1
	<i>Sambucus canadensis</i>	American black elderberry	Tree		1	1	1	1	1	1	2	
	<i>Ulmus americana</i>	american elm	Tree	FAC			2	2	1	1	1	1
	<i>Ulmus rubra</i>	slippery elm	Tree	FAC	1	1			1	1	2	2
Sum	Performance Standard				16	16	13	13	15	15	14	14
Mitigation Plan Performance Standard	Current Year Stem Count					16		13		15	14	14
	Stems/Acre					648		526		607	567	567
	Species Count					11		11		9	10	9
	Dominant Species Composition (%)					19		15		27	14	21
	Average Plot Height (ft.)					2		2		2	2	2
	% Invasives					0		0		0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					16		13		15	14	14
	Stems/Acre					648		526		607	567	567
	Species Count					11		11		9	10	9
	Dominant Species Composition (%)					19		15		27	14	21
	Average Plot Height (ft.)					2		2		2	2	2
	% Invasives					0		0		0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 7. Vegetation Performance Standards Summary Table

Dynamite Creek Mitigation Site

DMS Project No. 100125

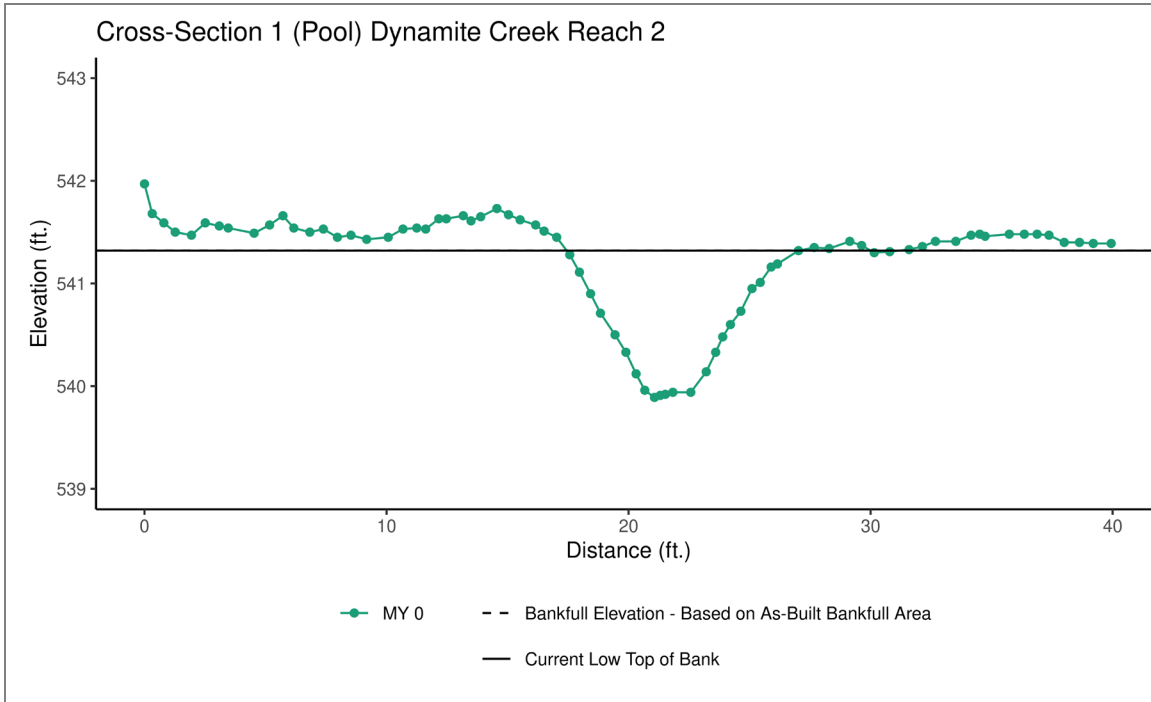
Monitoring Year 0 - 2022

	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	526	2	6	0	526	2	8	0	607	2	9	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	648	2	10	0	567	2	8	0	729	2	9	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	9	0	607	2	9	0	648	2	11	0
	Veg Plot 10 F				Veg Plot 11 F				Veg Plot Group 12 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	526	2	11	0	607	2	9	0	567	2	10	0
	Veg Plot Group 13 R											
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives								
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	567	2	9	0								

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

APPENDIX C. STREAM GEOMORPHOLOGY DATA

Cross-Section Plots

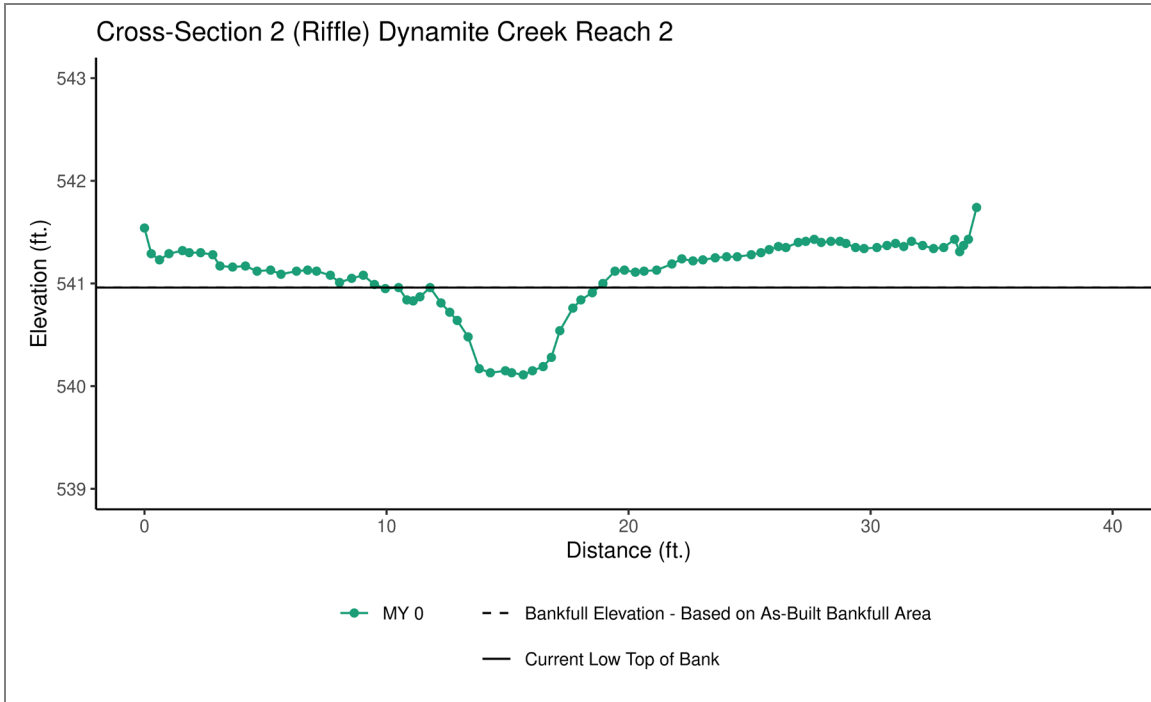


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	N/A					
Bank Height Ratio - Based on AB-Bankfull Area	N/A					
Thalweg Elevation	539.89					
LTOB Elevation	541.32					
LTOB Max Depth	1.43					
LTOB Cross-Sectional Area	7.39					



Downstream (11/03/2021)



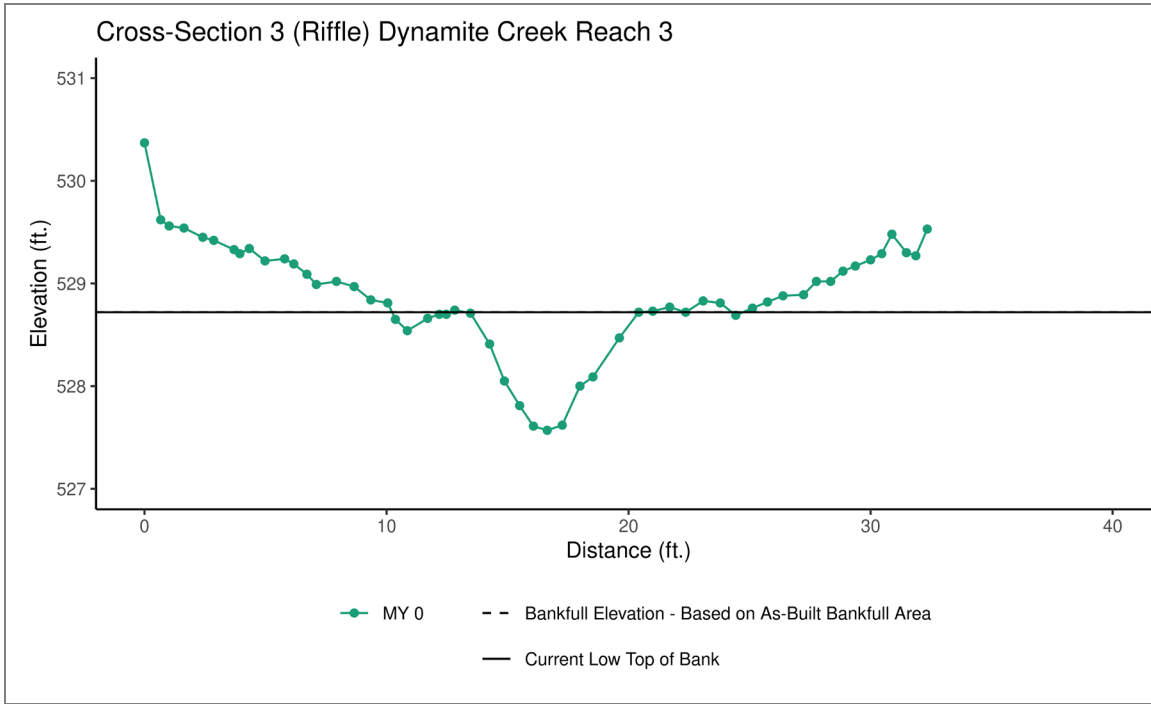


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	540.96					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	540.11					
LTOB Elevation	540.96					
LTOB Max Depth	0.85					
LTOB Cross-Sectional Area	3.53					



Downstream (11/03/2021)



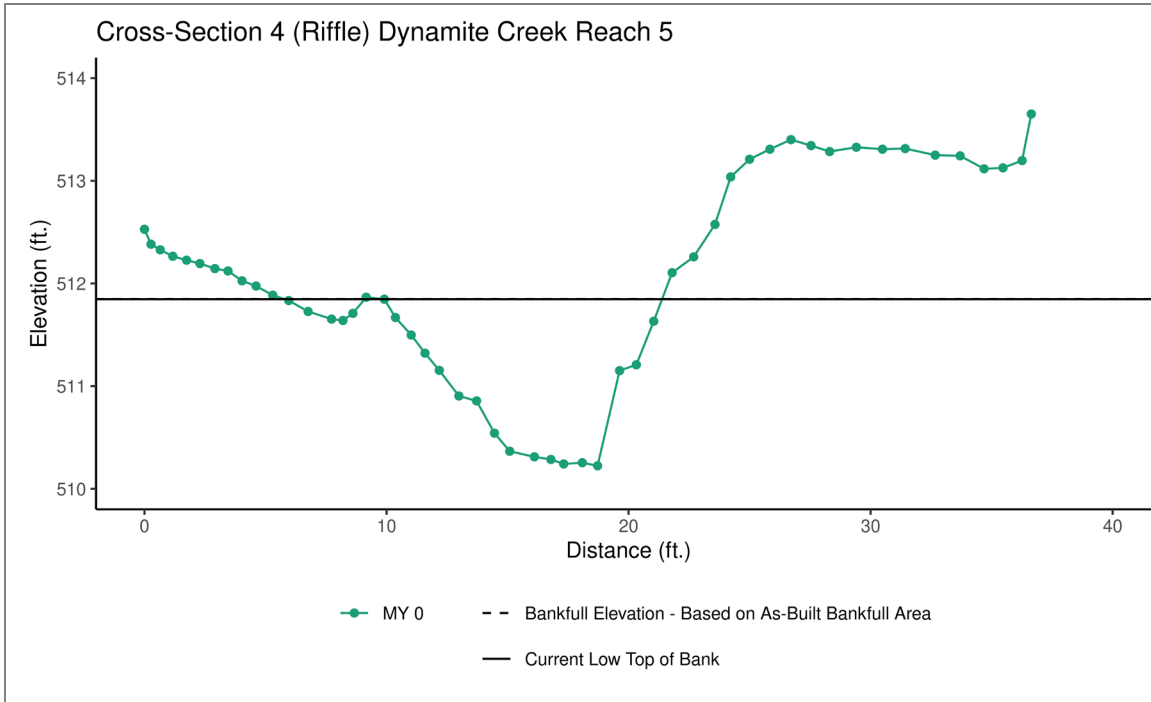


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	528.72					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	527.57					
LTOB Elevation	528.72					
LTOB Max Depth	1.15					
LTOB Cross-Sectional Area	4.45					



Downstream (11/03/2021)



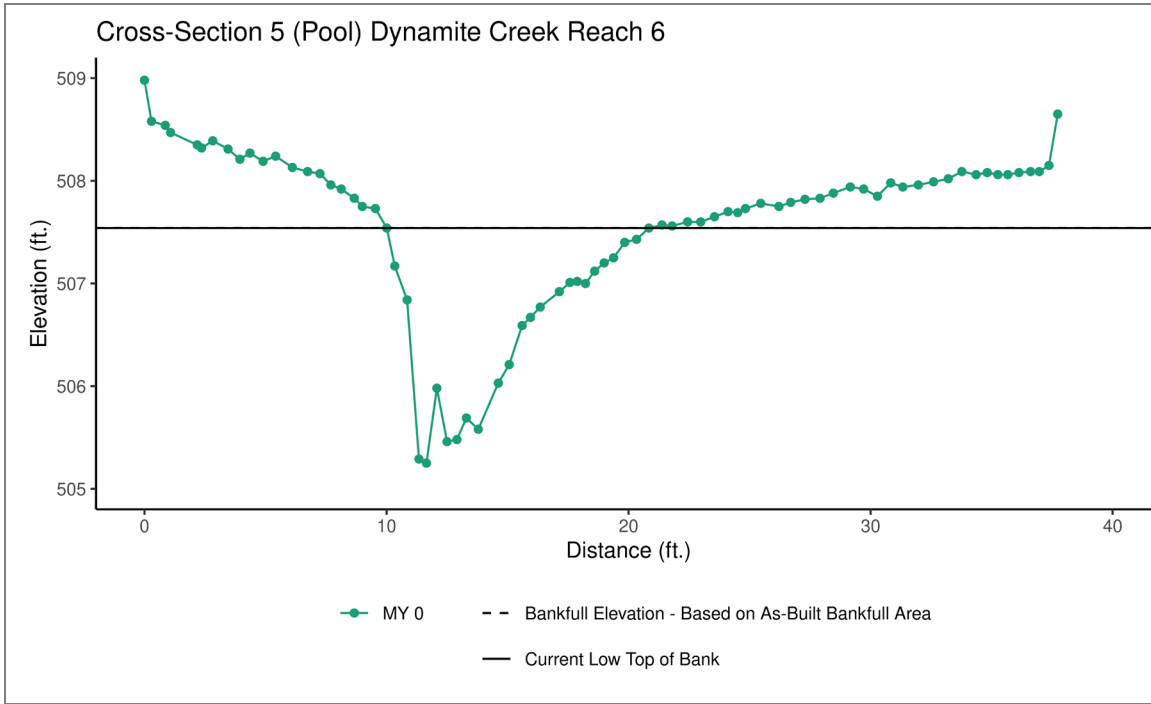


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	511.85					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	510.22					
LTOB Elevation	511.85					
LTOB Max Depth	1.62					
LTOB Cross-Sectional Area	11.45					



Downstream (11/03/2021)



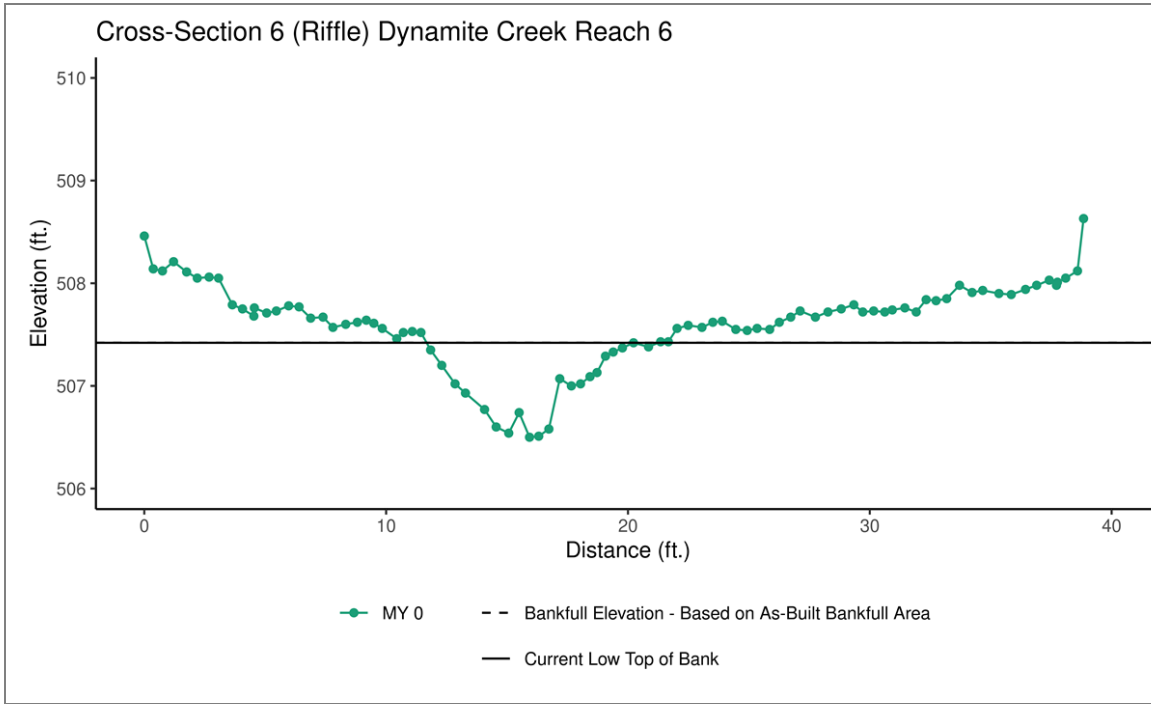


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	N/A					
Bank Height Ratio - Based on AB-Bankfull Area	N/A					
Thalweg Elevation	505.25					
LTOB Elevation	507.54					
LTOB Max Depth	2.29					
LTOB Cross-Sectional Area	11.01					



Downstream (11/10/2021)



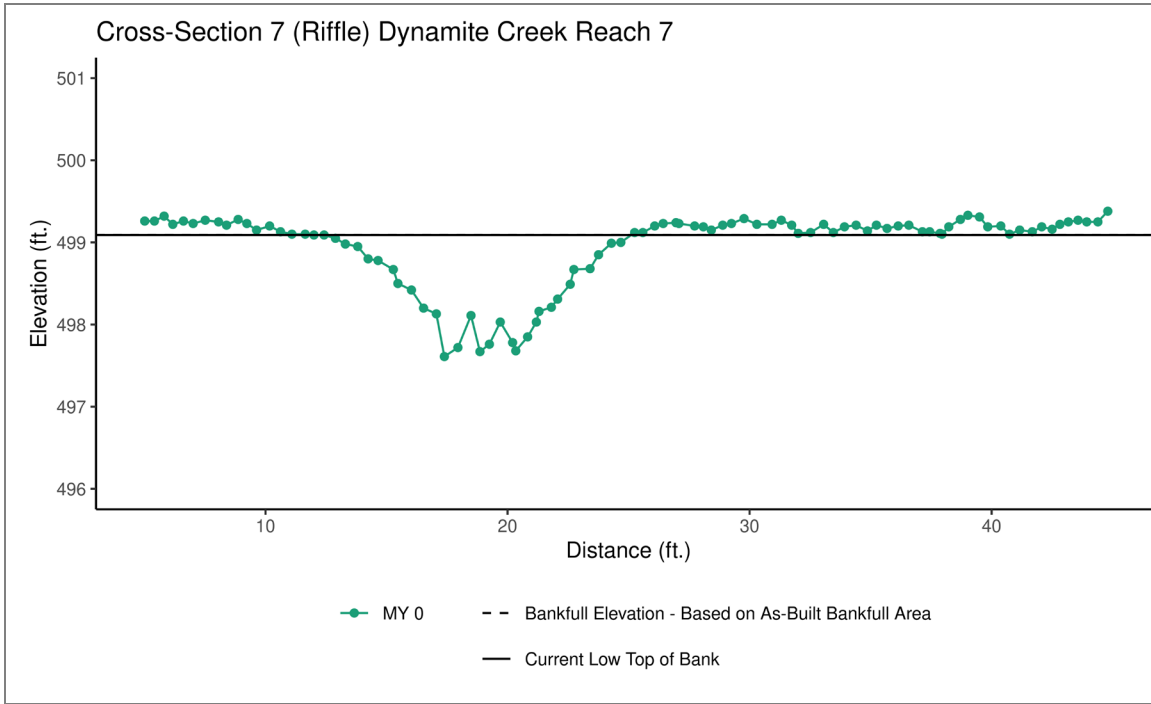


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	507.42					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	506.50					
LTOB Elevation	507.42					
LTOB Max Depth	0.92					
LTOB Cross-Sectional Area	4.06					



Downstream (11/10/2021)



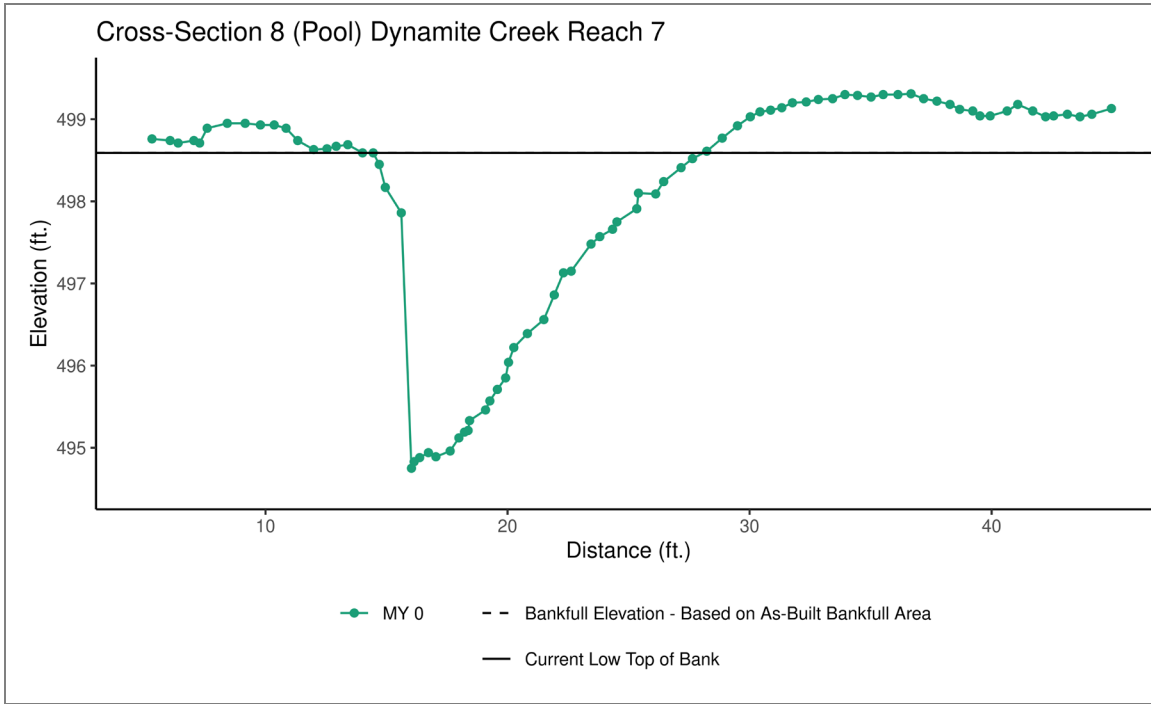


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	499.09					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	497.61					
LTOB Elevation	499.09					
LTOB Max Depth	1.47					
LTOB Cross-Sectional Area	8.84					



Downstream (11/03/2021)



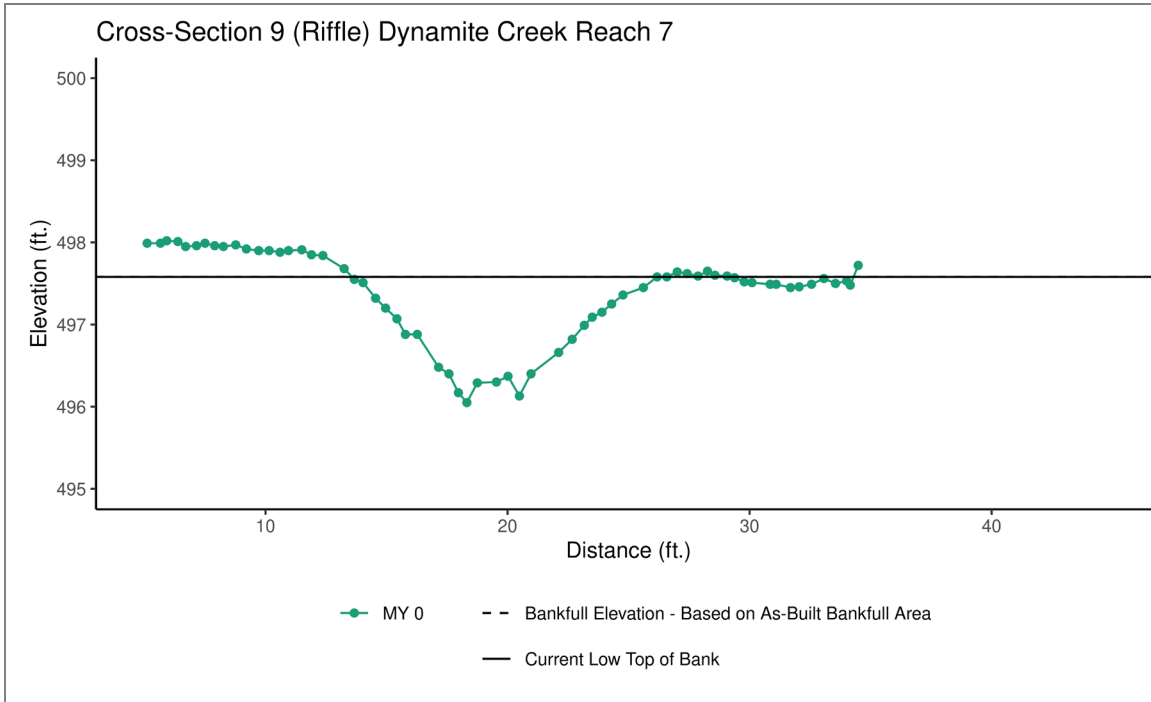


	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	N/A					
Bank Height Ratio - Based on AB-Bankfull Area	N/A					
Thalweg Elevation	494.75					
LTOB Elevation	498.59					
LTOB Max Depth	3.79					
LTOB Cross-Sectional Area	23.62					



Downstream (11/03/2021)





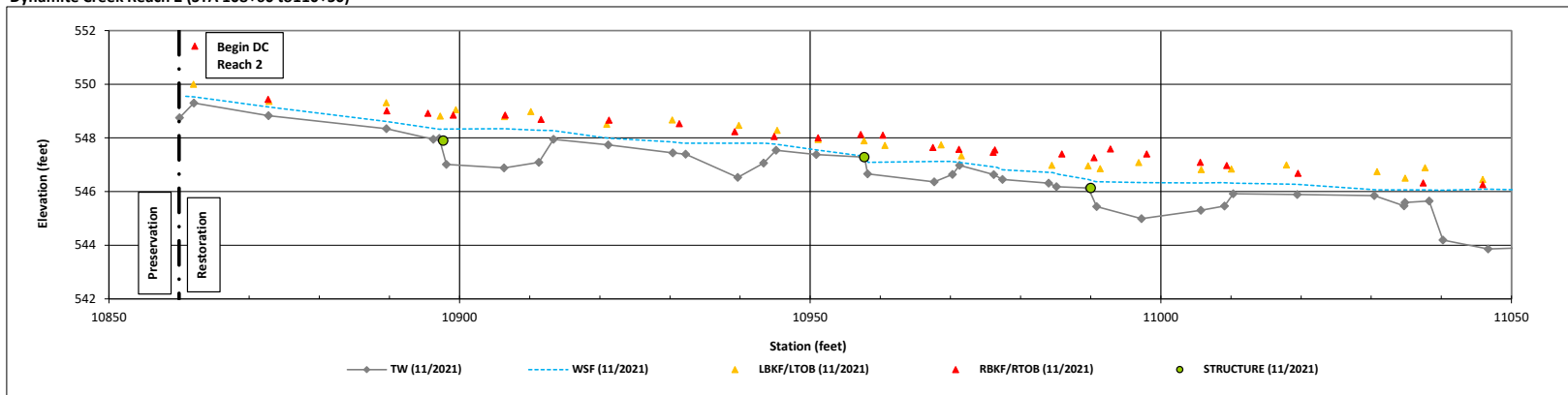
	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation - Based on AB-Bankfull Area	497.58					
Bank Height Ratio - Based on AB-Bankfull Area	1.00					
Thalweg Elevation	496.05					
LTOB Elevation	497.58					
LTOB Max Depth	1.52					
LTOB Cross-Sectional Area	9.61					



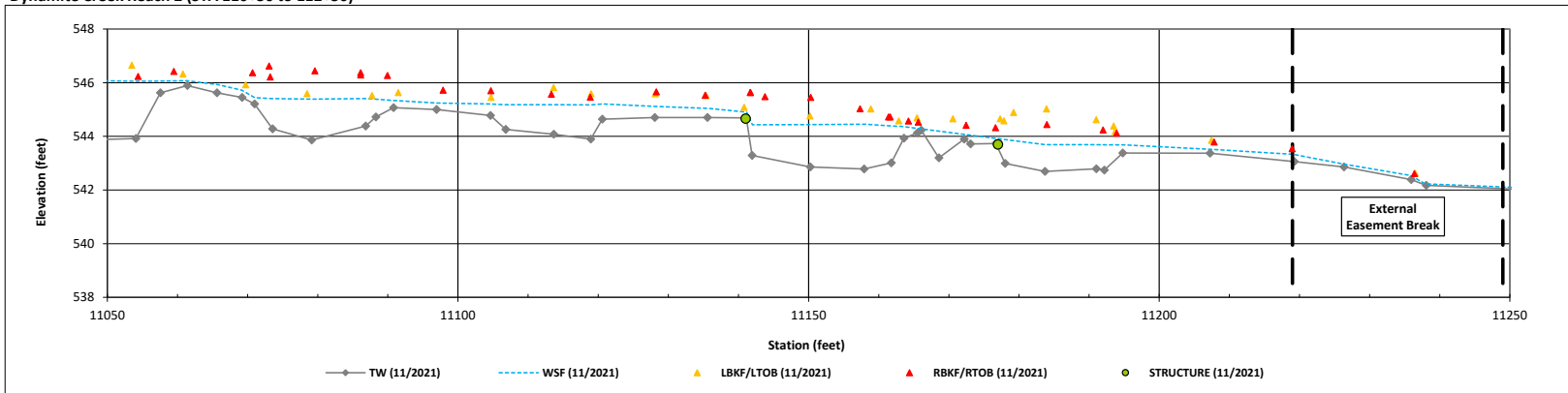
Downstream (11/03/2021)



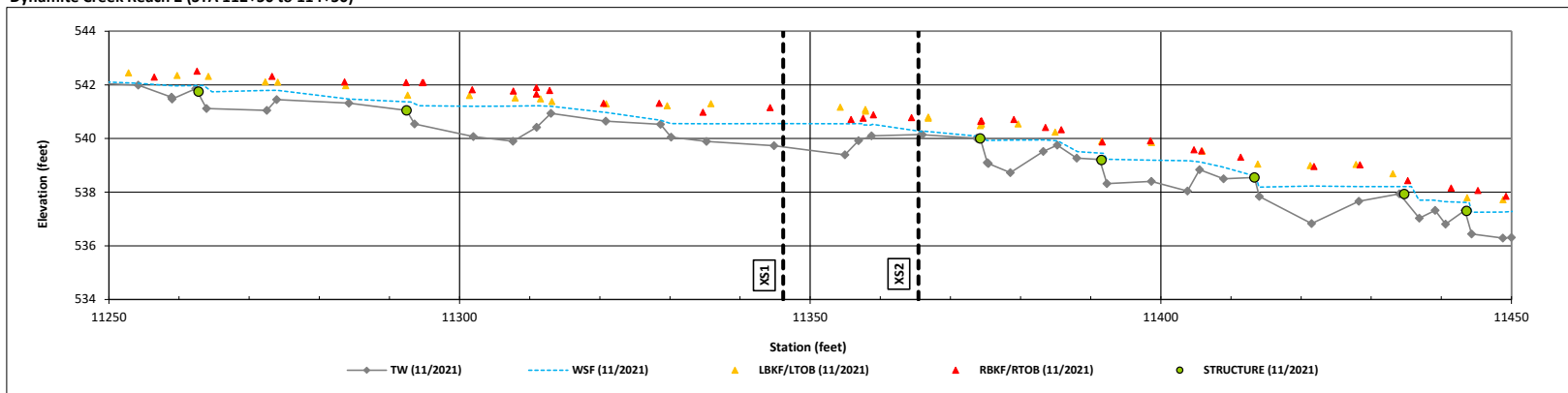
Dynamite Creek Reach 2 (STA 108+60 to 110+50)



Dynamite Creek Reach 2 (STA 110+50 to 112+50)



Dynamite Creek Reach 2 (STA 112+50 to 114+50)



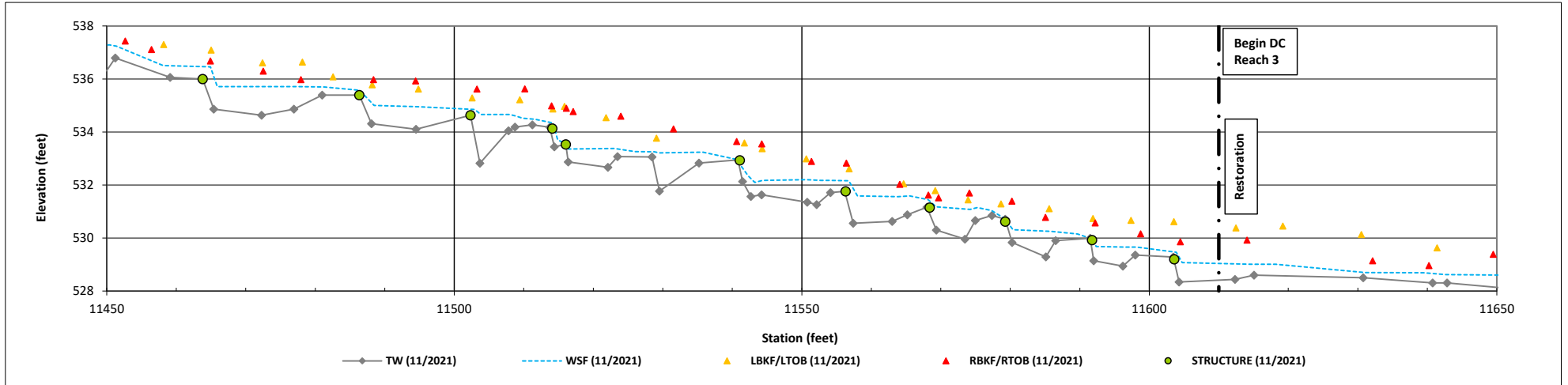
Longitudinal Profile Plots

Dynamite Creek Mitigation Site

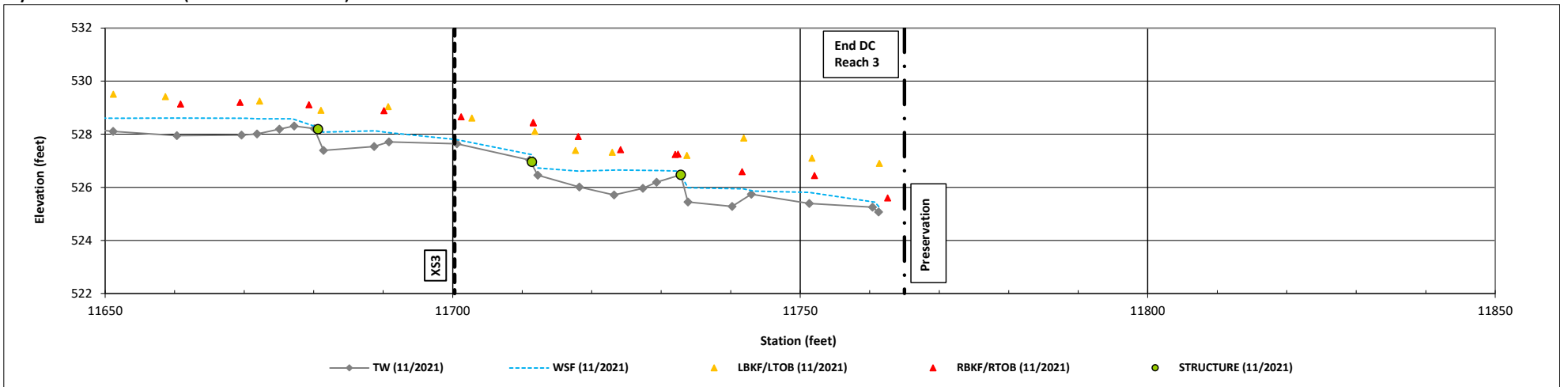
DMS Project No. 100125

Monitoring Year 0 - 2022

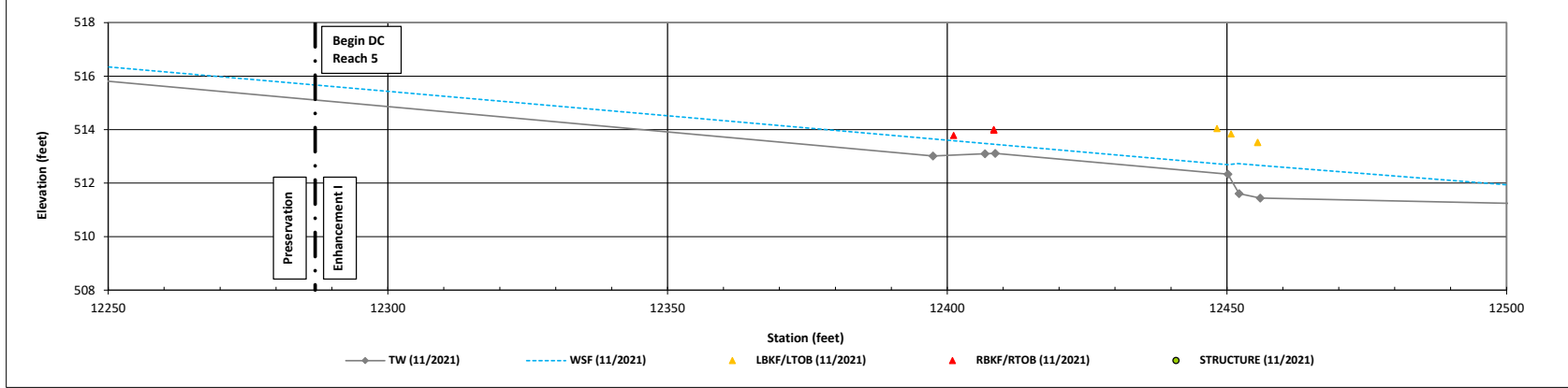
Dynamite Creek Reach 2 and Reach 3 (STA 114+50 to 116+50)



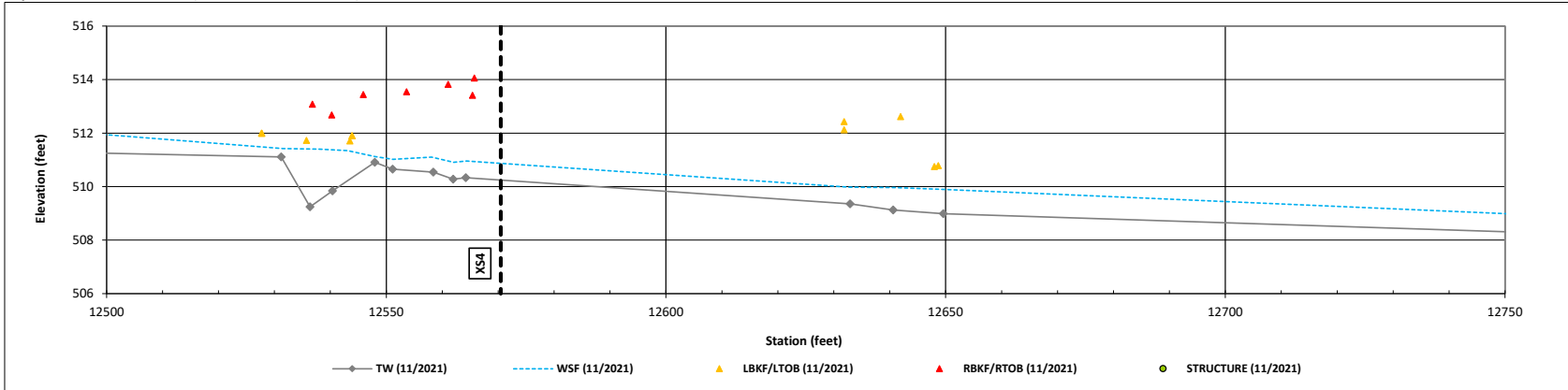
Dynamite Creek Reach 3 (STA 116+50 to 117+65)



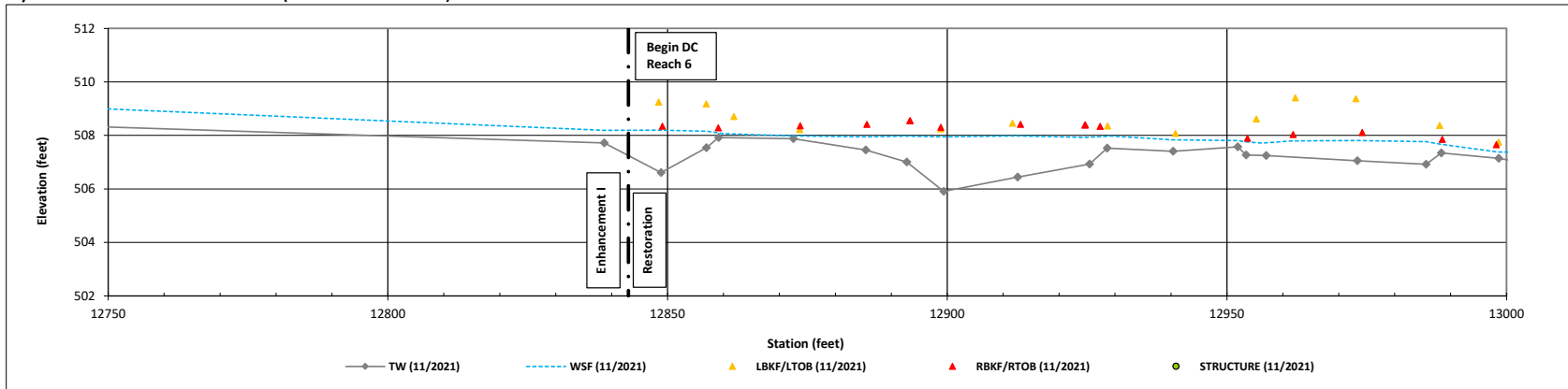
Dynamite Creek Reach 5¹ (STA 122+87 to 125+00)



Dynamite Creek Reach 5¹ (STA 125+00 to 127+50)

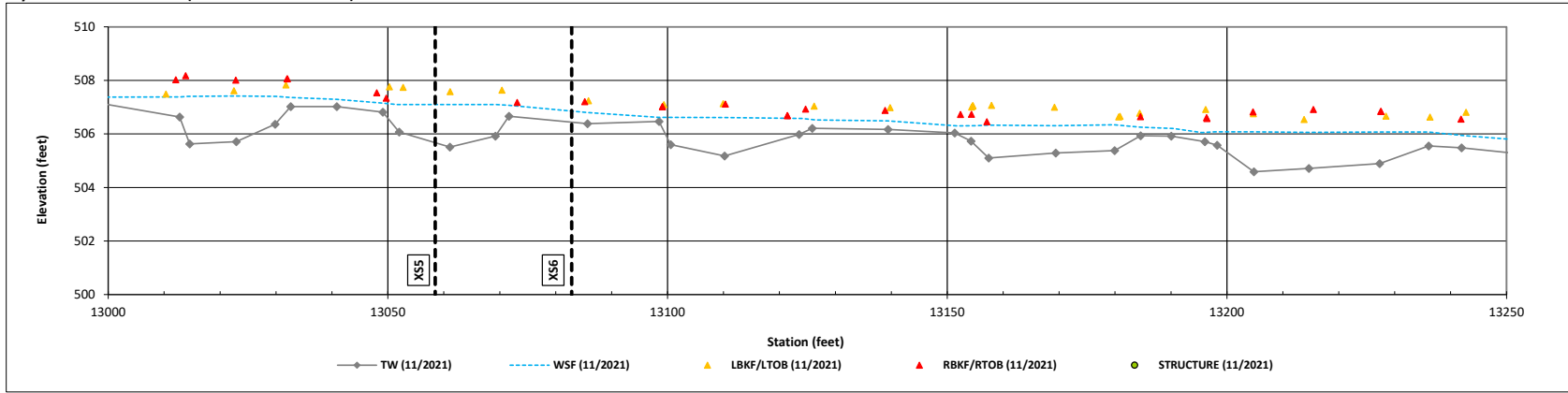


Dynamite Creek Reach 5¹ and Reach 6 (STA 127+50 to 130+00)

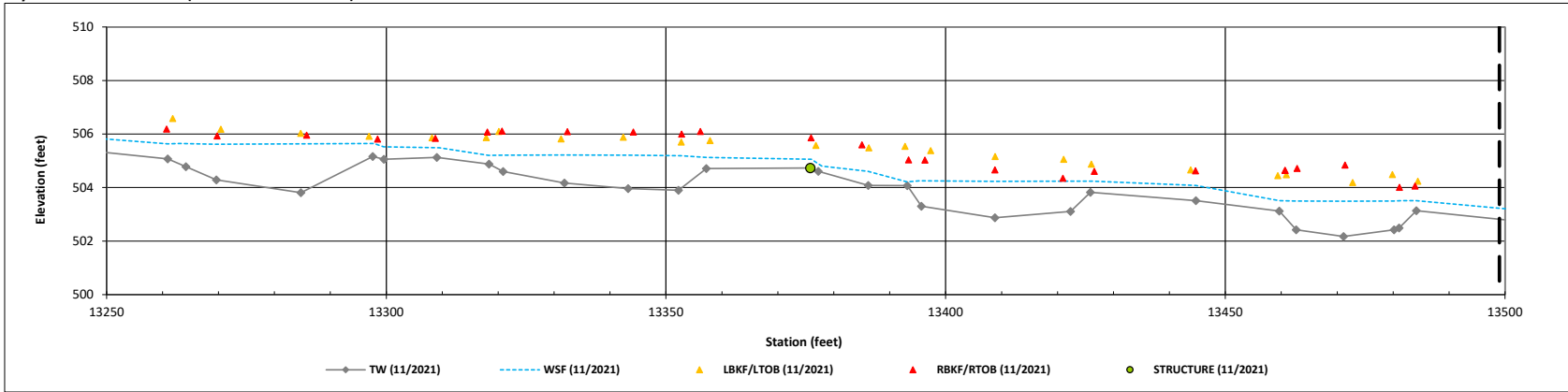


¹A light touch approach was used on Reach 5, only short sections of work were done without full design parameters. As-Built survey was conducted only on sections where bank and pattern stabilization work were necessary.

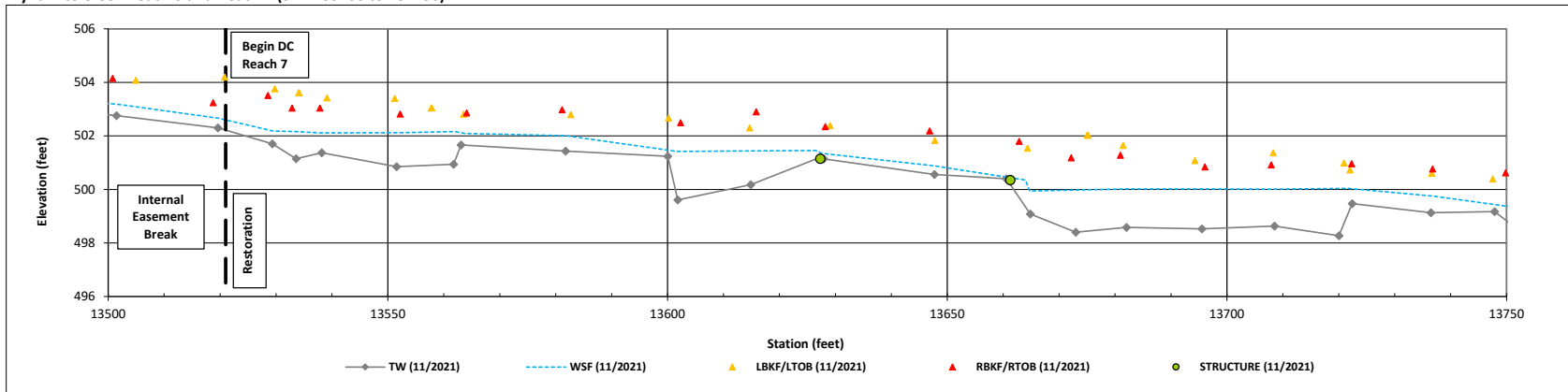
Dynamite Creek Reach 6 (STA 130+00 to 132+50)



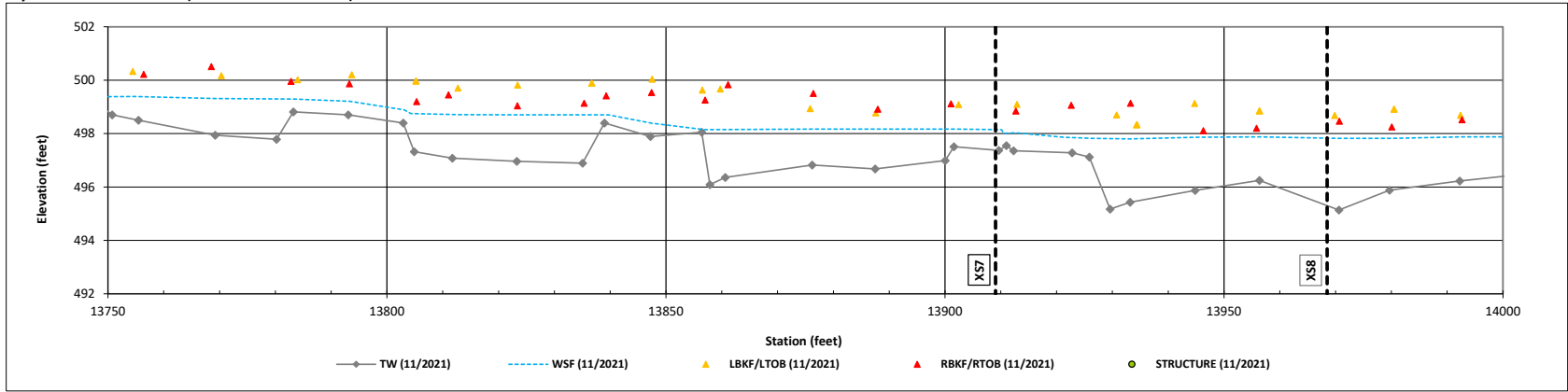
Dynamite Creek Reach 6 (STA 132+50 to 135+00)



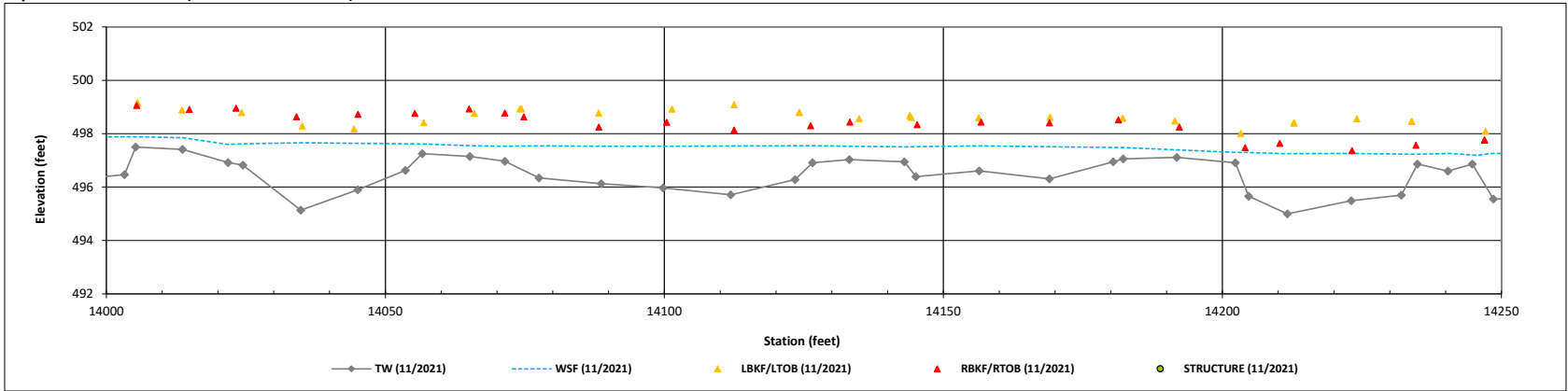
Dynamite Creek Reach 6 and Reach 7 (STA 135+00 to 137+50)



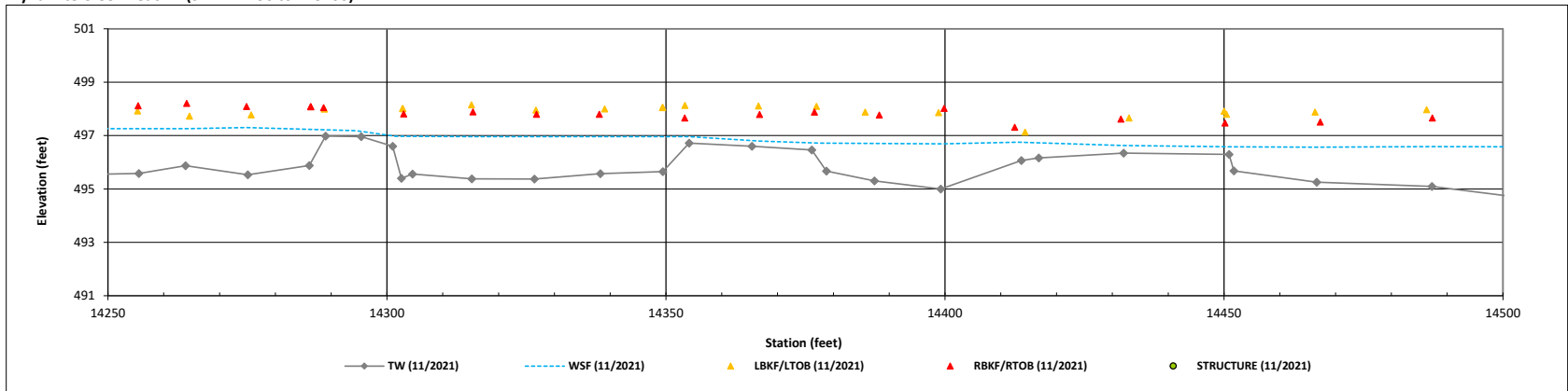
Dynamite Creek Reach 7 (STA 137+50 to 140+00)



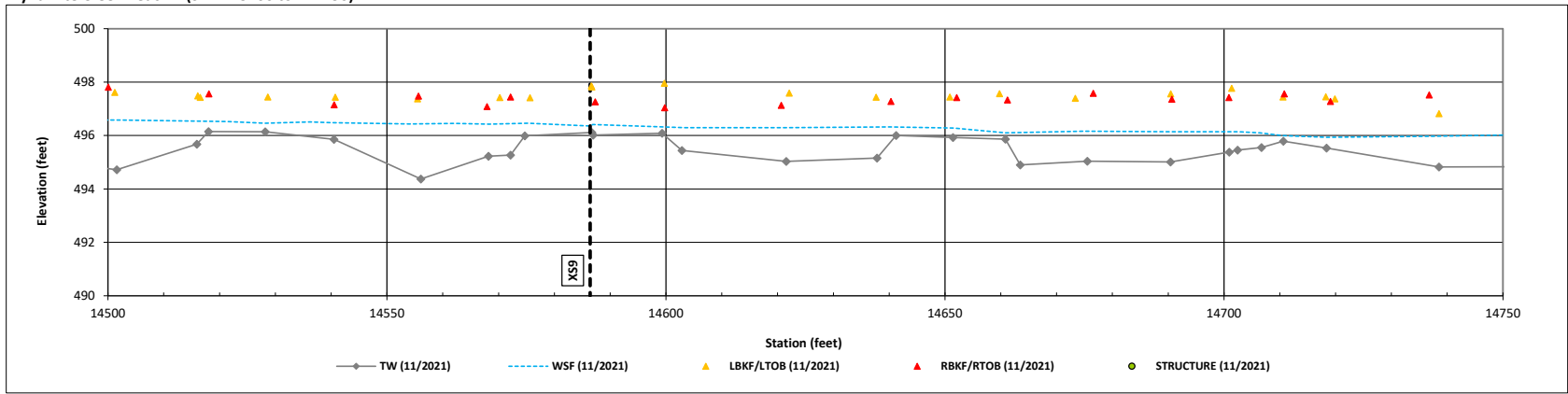
Dynamite Creek Reach 7 (STA 140+00 to 142+50)



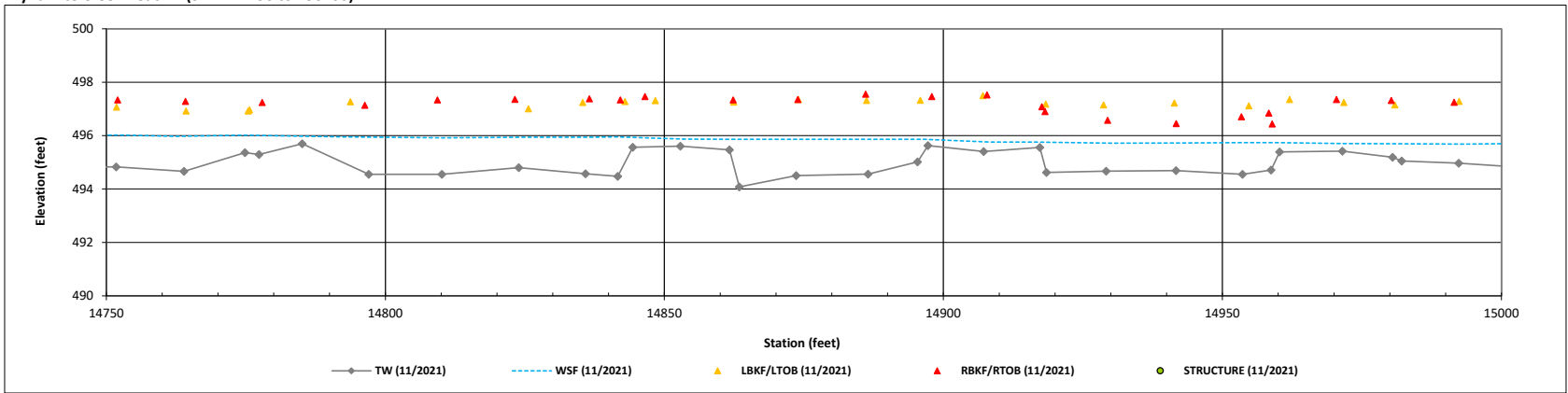
Dynamite Creek Reach 7 (STA 142+50 to 145+00)



Dynamite Creek Reach 7 (STA 145+00 to 147+50)



Dynamite Creek Reach 7 (STA 147+50 to 150+00)



Dynamite Creek Reach 7 (STA 150+00 to 150+91)

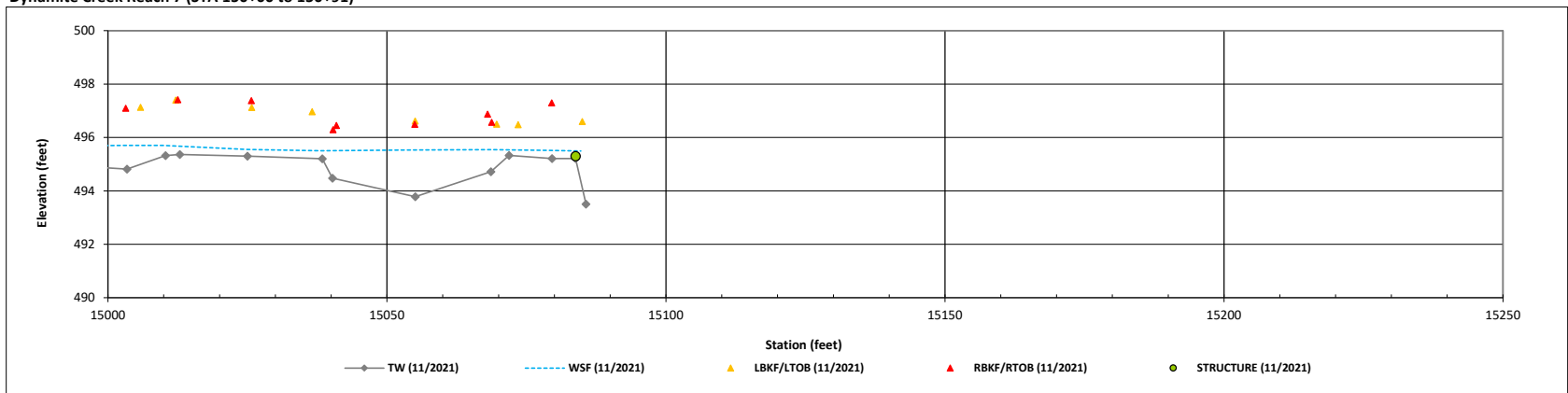


Table 8. Baseline Stream Data Summary

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Parameter	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)			
	Dynamite Creek Reach 2								
Riffle Only	Min	Max	n	Min	Max	Min	Max	n	
Bankfull Width (ft)	4.2		1	6.1		6.7		1	
Floodprone Width (ft)	6.6		1	90		90		1	
Bankfull Mean Depth	0.7		1	0.5		0.5		1	
Bankfull Max Depth	1.0		1	0.8		0.9		1	
Bankfull Cross Sectional Area (ft ²)	3.1		1	3.0		3.5		1	
Width/Depth Ratio	6.0		1	12.6		12.7		1	
Entrenchment Ratio	1.6		1	>2.2		13.4		1	
Bank Height Ratio	5.3		1	1.0		1.0		1	
Max part size (mm) mobilized at bankfull	67			40		40			
Rosgen Classification	E4			B4/C4		B4/C4			
Bankfull Discharge (cfs)	10.3		1	8.8		8.8			
Sinuosity	1.30			1.10		1.10			
Water Surface Slope (ft/ft) ²	0.0155		1	0.0177		0.0270			
Other	---			---		---			
Parameter	Dynamite Creek Reach 3								
Riffle Only	Min	Max	n	Min	Max	Min	Max	n	
Bankfull Width (ft)	7.8		1	6.4		7.0		1	
Floodprone Width (ft)	9		1	40		40		1	
Bankfull Mean Depth	0.4		1	0.5		0.6		1	
Bankfull Max Depth	0.5		1	0.7		1.2		1	
Bankfull Cross Sectional Area (ft ²)	3.1		1	3.0		4.5		1	
Width/Depth Ratio	19.5		1	13.6		10.9		1	
Entrenchment Ratio	1.2		1	>2.2		5.8		1	
Bank Height Ratio	5.6		1	1.0		1.0		1	
Max part size (mm) mobilized at bankfull	70			40		40			
Rosgen Classification	C4			B4/C4		B4/C4			
Bankfull Discharge (cfs)	10.5			9.2		9.0			
Sinuosity	1.00			1.10		1.10			
Water Surface Slope (ft/ft) ²	0.0120	0.0300	1	0.0192		0.0253			
Other	---			---		---			
Parameter	Dynamite Creek Reach 5 ¹								
Riffle Only	Min	Max	n	Min	Max	Min	Max	n	
Bankfull Width (ft)	8.7		1	N/A		11.1		1	
Floodprone Width (ft)	11		1	N/A		77		1	
Bankfull Mean Depth	0.6		1	N/A		1.0		1	
Bankfull Max Depth	0.8		1	N/A		1.6		1	
Bankfull Cross Sectional Area (ft ²)	5.3		1	N/A		11.4		1	
Width/Depth Ratio	14.5		1	N/A		10.9		1	
Entrenchment Ratio	1.3		1	N/A		6.9		1	
Bank Height Ratio	2.6		1	N/A		1.0		1	
Max part size (mm) mobilized at bankfull	N/A			N/A		N/A			
Rosgen Classification	E4			N/A		E4			
Bankfull Discharge (cfs)	16.0			N/A		14.4			
Sinuosity	1.70			N/A		1.70			
Water Surface Slope (ft/ft) ²	0.0090	0.0140	1	N/A		0.0116			
Other	---			---		---			

¹A light touch approach was used on Reach 5, only short sections of work were done without full design parameters.

Table 8. Baseline Stream Data Summary

Dynamite Creek Mitigation Site
 DMS Project No. 100125
Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	Dynamite Creek Reach 6							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	8.3		1	8.5		8.6		1
Floodprone Width (ft)	11.4		1	>19		39		1
Bankfull Mean Depth	0.9		1	0.7		0.5		1
Bankfull Max Depth	1.1		1	1.1		0.9		1
Bankfull Cross Sectional Area (ft ²)	7.2		1	5.7		4.1		1
Width/Depth Ratio	9.2		1	12.6		18.0		1
Entrenchment Ratio	1.4		1	>2.2		4.6		1
Bank Height Ratio	2.9		1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	51			28		28		
Rosgen Classification	E4			C4		C4		
Bankfull Discharge (cfs)	22.2		1	15.4		15.5		
Sinuosity	1.30			1.30		1.30		
Water Surface Slope (ft/ft) ²	0.0093		1	0.0094		0.0074		
Other	---			---		---		
Parameter	Dynamite Creek Reach 7							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	9.9		1	10.9		12.3	12.5	2
Floodprone Width (ft)	>500		1	>24		300	473	2
Bankfull Mean Depth	0.9		1	0.9		0.7	0.8	2
Bankfull Max Depth	2.0		1	1.4		1.5	1.5	2
Bankfull Cross Sectional Area (ft ²)	12.8		1	9.4		8.8	9.6	2
Width/Depth Ratio	7.6		1	12.7		16.3	17.1	2
Entrenchment Ratio	>2.2		1	>2.2		23.2	37.8	2
Bank Height Ratio	1.0		1	1.0		1.0		2
Max part size (mm) mobilized at bankfull	18			17.8		17.8		
Rosgen Classification	C5			E4		E4		
Bankfull Discharge (cfs)	33.3		1	24.1		24.0		
Sinuosity	1.00			1.10		1.10		
Water Surface Slope (ft/ft) ²	0.00303		1	0.0470		0.0043		
Other	---			---		---		

Table 9. Cross-Section Morphology Monitoring Summary

Dynamite Creek Mitigation Site
 DMS Project No. 100125
Monitoring Year 0 - 2022

	Dynamite Creek Reach 2												Dynamite Creek Reach 3					
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	N/A						540.96						528.72					
Bank Height Ratio - Based on AB Bankfull ¹ Area	N/A						1.00						1.00					
Thalweg Elevation	539.89						540.11						527.57					
LTOB ² Elevation	541.32						540.96						528.72					
LTOB ² Max Depth (ft)	1.43						0.85						1.15					
LTOB ² Cross Sectional Area (ft ²)	7.39						3.53						4.45					
	Dynamite Creek Reach 5						Dynamite Creek Reach 6											
	Cross-Section 4 (Riffle)						Cross-Section 5 (Pool)						Cross-Section 6 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	511.85						N/A						507.52					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00						N/A						1.00					
Thalweg Elevation	510.22						505.25						506.50					
LTOB ² Elevation	511.85						507.54						507.52					
LTOB ² Max Depth (ft)	1.62						2.29						1.02					
LTOB ² Cross Sectional Area (ft ²)	11.45						11.01						5.10					
	Dynamite Creek Reach 7																	
	Cross-Section 7 (Riffle)						Cross-Section 8 (Pool)						Cross-Section 9 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	499.09						N/A						497.58					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00						N/A						1.00					
Thalweg Elevation	497.61						494.75						496.05					
LTOB ² Elevation	499.09						498.59						497.58					
LTOB ² Max Depth (ft)	1.47						3.79						1.52					
LTOB ² Cross Sectional Area (ft ²)	8.84						23.62						9.61					

¹Bank Height Ratio (BHR) takes the As-built bankfull area as the basis for adjusting each subsequent years bankfull elevation.

²LTOB Area and Max depth - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recoded and tracked above as LTOB max depth.

Reachwide Pebble Count Plots

Dynamite Creek Mitigation Site

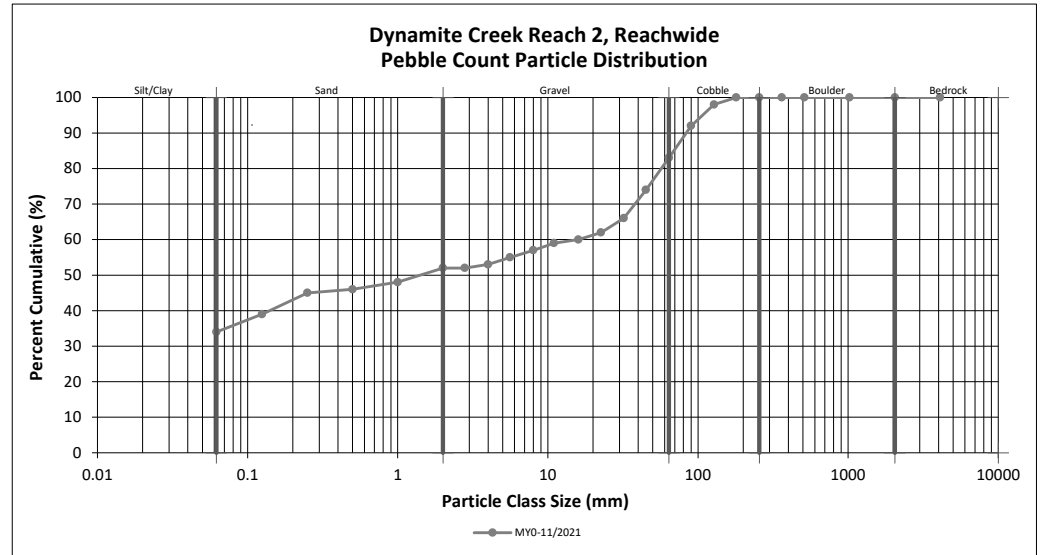
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062	3	31	34	34	34
<i>SAND</i>	Very fine	0.062	0.125		5	5	5	39
	Fine	0.125	0.250		6	6	6	45
	Medium	0.25	0.50		1	1	1	46
	Coarse	0.5	1.0	1	1	2	2	48
	Very Coarse	1.0	2.0	4		4	4	52
<i>GRAVEL</i>	Very Fine	2.0	2.8					52
	Very Fine	2.8	4.0		1	1	1	53
	Fine	4.0	5.6	1	1	2	2	55
	Fine	5.6	8.0		2	2	2	57
	Medium	8.0	11.0	2		2	2	59
	Medium	11.0	16.0	1		1	1	60
	Coarse	16.0	22.6	1	1	2	2	62
	Coarse	22.6	32	4		4	4	66
	Very Coarse	32	45	8		8	8	74
	Very Coarse	45	64	8	1	9	9	83
<i>COBBLE</i>	Small	64	90	9		9	9	92
	Small	90	128	6		6	6	98
	Large	128	180	2		2	2	100
	Large	180	256					100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.07
D ₅₀ =	1.4
D ₈₄ =	66.5
D ₉₅ =	107.3
D ₁₀₀ =	180.0



Reachwide Pebble Count Plots

Dynamite Creek Mitigation Site

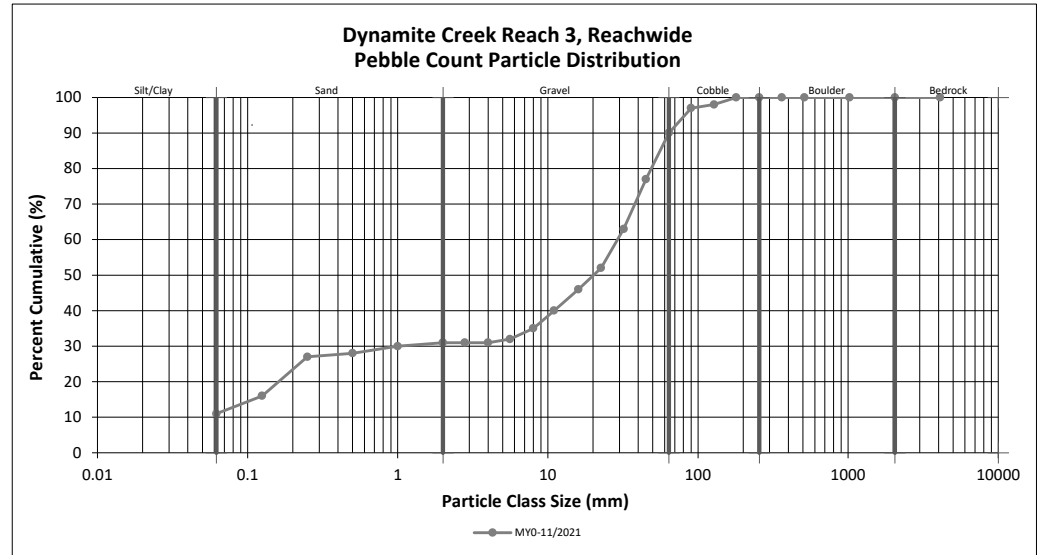
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 3, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		11	11	11	11
<i>SAND</i>	Very fine	0.062	0.125		5	5	5	16
	Fine	0.125	0.250	1	10	11	11	27
	Medium	0.25	0.50		1	1	1	28
	Coarse	0.5	1.0	2		2	2	30
	Very Coarse	1.0	2.0	1		1	1	31
<i>GRAVEL</i>	Very Fine	2.0	2.8					31
	Very Fine	2.8	4.0					31
	Fine	4.0	5.6		1	1	1	32
	Fine	5.6	8.0	2	1	3	3	35
	Medium	8.0	11.0	4	1	5	5	40
	Medium	11.0	16.0	3	3	6	6	46
	Coarse	16.0	22.6	2	4	6	6	52
	Coarse	22.6	32	8	3	11	11	63
	Very Coarse	32	45	10	4	14	14	77
	Very Coarse	45	64	7	6	13	13	90
<i>COBBLE</i>	Small	64	90	7		7	7	97
	Small	90	128	1		1	1	98
	Large	128	180	2		2	2	100
	Large	180	256					100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
		Total		50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	0.13
D ₃₅ =	8.00
D ₅₀ =	20.1
D ₈₄ =	54.4
D ₉₅ =	81.6
D ₁₀₀ =	180.0



Reachwide Pebble Count Plots

Dynamite Creek Mitigation Site

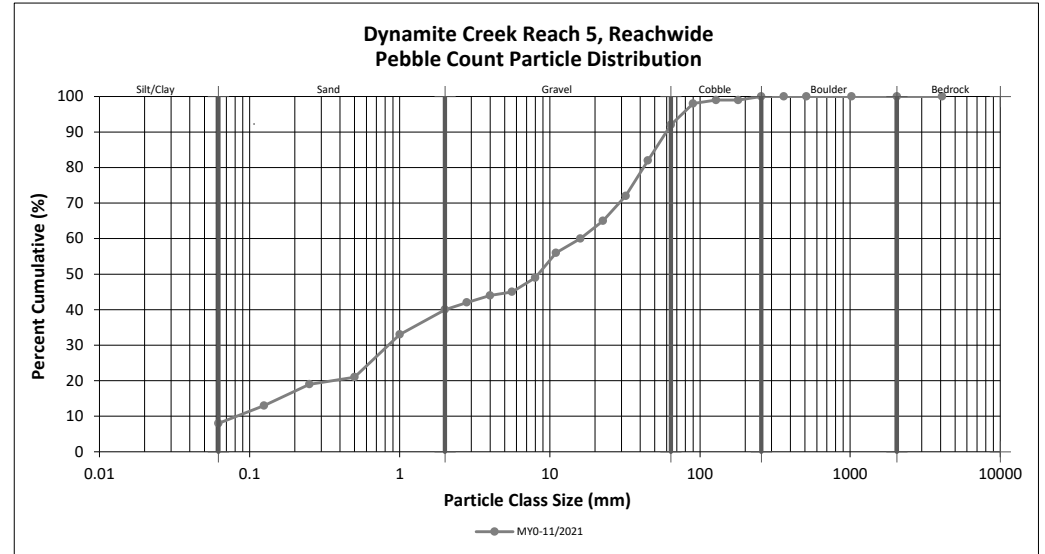
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 5, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		8	8	8	8
<i>SAND</i>	Very fine	0.062	0.125		5	5	5	13
	Fine	0.125	0.250	1	5	6	6	19
	Medium	0.25	0.50	1	1	2	2	21
	Coarse	0.5	1.0	2	10	12	12	33
	Very Coarse	1.0	2.0	2	5	7	7	40
<i>GRAVEL</i>	Very Fine	2.0	2.8		2	2	2	42
	Very Fine	2.8	4.0		2	2	2	44
	Fine	4.0	5.6		1	1	1	45
	Fine	5.6	8.0	3	1	4	4	49
	Medium	8.0	11.0	4	3	7	7	56
	Medium	11.0	16.0	3	1	4	4	60
	Coarse	16.0	22.6	5		5	5	65
	Coarse	22.6	32	4	3	7	7	72
	Very Coarse	32	45	8	2	10	10	82
	Very Coarse	45	64	9	1	10	10	92
<i>COBBLE</i>	Small	64	90	6		6	6	98
	Small	90	128	1		1	1	99
	Large	128	180					99
	Large	180	256	1		1	1	100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	0.18
D ₃₅ =	1.22
D ₅₀ =	8.4
D ₈₄ =	48.3
D ₉₅ =	75.9
D ₁₀₀ =	256.0



Reachwide Pebble Count Plots

Dynamite Creek Mitigation Site

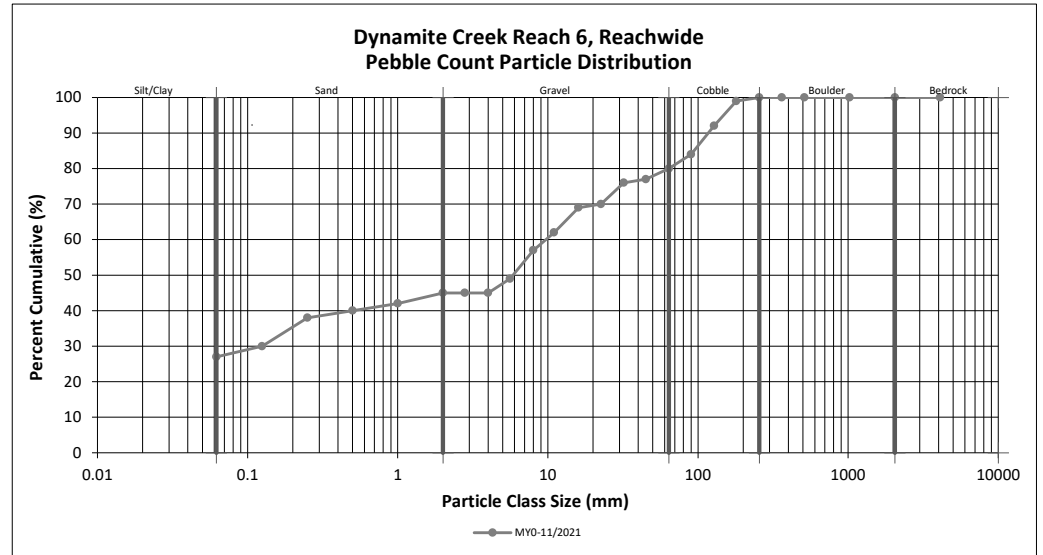
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 6, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062	2	25	27	27	27
<i>SAND</i>	Very fine	0.062	0.125		3	3	3	30
	Fine	0.125	0.250		8	8	8	40
	Medium	0.25	0.50	1	1	2	2	42
	Coarse	0.5	1.0	2		2	2	44
	Very Coarse	1.0	2.0	3		3	3	47
<i>GRAVEL</i>	Very Fine	2.0	2.8					45
	Very Fine	2.8	4.0					45
	Fine	4.0	5.6		4	4	4	49
	Fine	5.6	8.0	3	5	8	8	57
	Medium	8.0	11.0	4	1	5	5	62
	Medium	11.0	16.0	5	2	7	7	69
	Coarse	16.0	22.6	1		1	1	70
	Coarse	22.6	32	5	1	6	6	76
	Very Coarse	32	45	1		1	1	77
	Very Coarse	45	64	3		3	3	80
<i>COBBLE</i>	Small	64	90	4		4	4	84
	Small	90	128	8		8	8	92
	Large	128	180	7		7	7	99
	Large	180	256	1		1	1	100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.19
D ₅₀ =	5.9
D ₈₄ =	90.0
D ₉₅ =	148.1
D ₁₀₀ =	256.0



Reachwide Pebble Count Plots

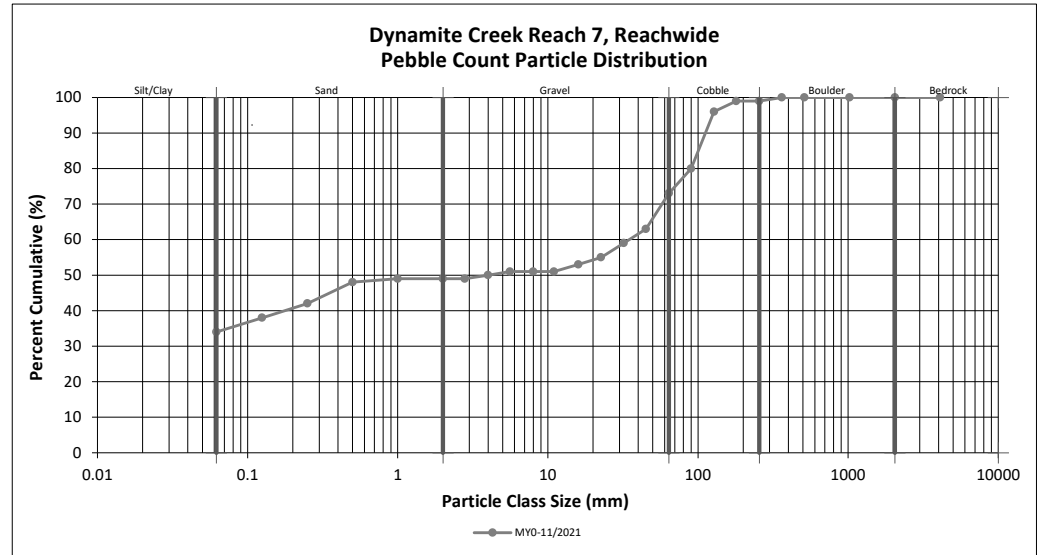
Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 7, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062	2	32	34	34	34
<i>SAND</i>	Very fine	0.062	0.125		4	4	4	38
	Fine	0.125	0.250	1	3	4	4	42
	Medium	0.25	0.50		6	6	6	48
	Coarse	0.5	1.0	1		1	1	49
	Very Coarse	1.0	2.0					49
<i>GRAVEL</i>	Very Fine	2.0	2.8					49
	Very Fine	2.8	4.0		1	1	1	50
	Fine	4.0	5.6		1	1	1	51
	Fine	5.6	8.0					51
	Medium	8.0	11.0					51
	Medium	11.0	16.0		2	2	2	53
	Coarse	16.0	22.6	1	1	2	2	55
	Coarse	22.6	32	4		4	4	59
	Very Coarse	32	45	4		4	4	63
	Very Coarse	45	64	10		10	10	73
<i>COBBLE</i>	Small	64	90	7		7	7	80
	Small	90	128	16		16	16	96
	Large	128	180	3		3	3	99
	Large	180	256					99
<i>BOULDER</i>	Small	256	362	1		1	1	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100



Reachwide Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.07
D ₅₀ =	4.0
D ₈₄ =	98.3
D ₉₅ =	125.2
D ₁₀₀ =	362.0

Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

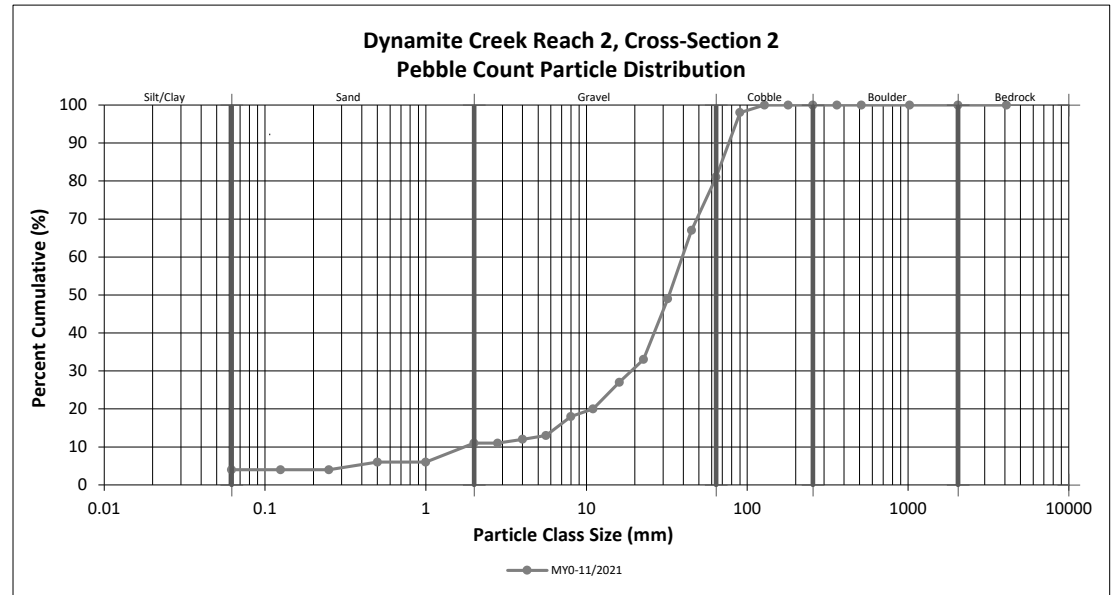
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 2, Cross-Section 2

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	4	4	4
SAND	Very fine	0.062	0.125			4
	Fine	0.125	0.250			4
	Medium	0.25	0.50	2	2	6
	Coarse	0.5	1.0			6
GRAVEL	Very Coarse	1.0	2.0	5	5	11
	Very Fine	2.0	2.8			11
	Very Fine	2.8	4.0	1	1	12
	Fine	4.0	5.6	1	1	13
	Fine	5.6	8.0	5	5	18
	Medium	8.0	11.0	2	2	20
	Medium	11.0	16.0	7	7	27
	Coarse	16.0	22.6	6	6	33
	Coarse	22.6	32	16	16	49
	Very Coarse	32	45	18	18	67
COBBLE	Very Coarse	45	64	14	14	81
	Small	64	90	17	17	98
	Small	90	128	2	2	100
	Large	128	180			100
BOULDER	Large	180	256			100
	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
BEDROCK	Large/Very Large	1024	2048			100
	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 2	
Channel materials (mm)	
D ₁₆ =	6.94
D ₃₅ =	23.60
D ₅₀ =	32.6
D ₈₄ =	68.0
D ₉₅ =	84.7
D ₁₀₀ =	128.0



Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

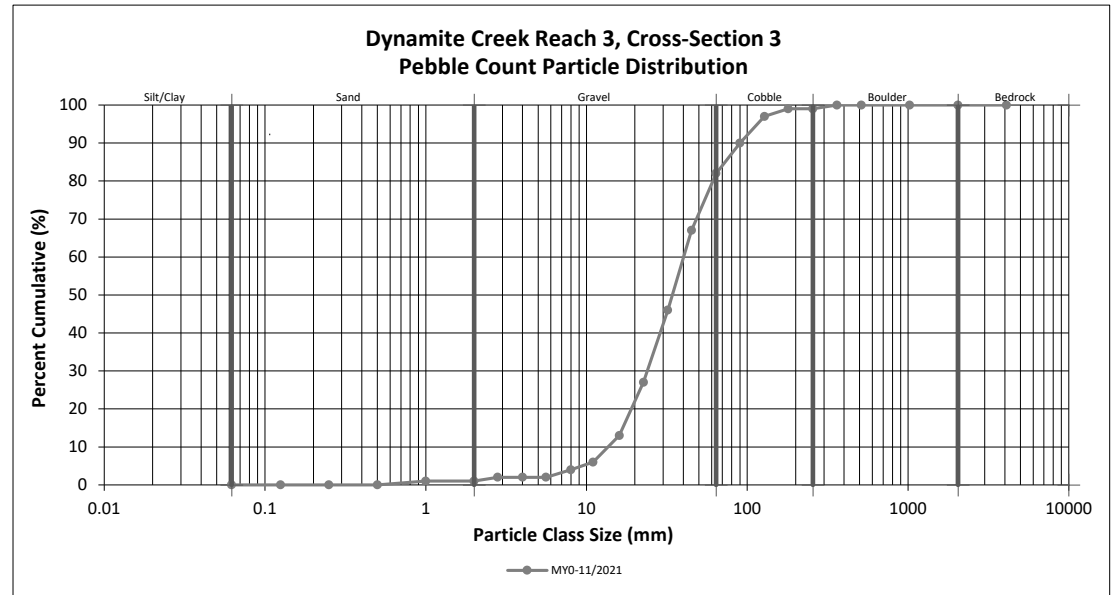
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 3, Cross-Section 3

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0	1	1	1
	Very Coarse	1.0	2.0			1
GRAVEL	Very Fine	2.0	2.8	1	1	2
	Very Fine	2.8	4.0			2
	Fine	4.0	5.6			2
	Fine	5.6	8.0	2	2	4
	Medium	8.0	11.0	2	2	6
	Medium	11.0	16.0	7	7	13
	Coarse	16.0	22.6	14	14	27
	Coarse	22.6	32	19	19	46
	Very Coarse	32	45	21	21	67
	Very Coarse	45	64	15	15	82
COBBLE	Small	64	90	8	8	90
	Small	90	128	7	7	97
	Large	128	180	2	2	99
	Large	180	256			99
BOULDER	Small	256	362	1	1	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 3	
Channel materials (mm)	
D ₁₆ =	17.23
D ₃₅ =	26.16
D ₅₀ =	34.1
D ₈₄ =	69.7
D ₉₅ =	115.7
D ₁₀₀ =	362.0



Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

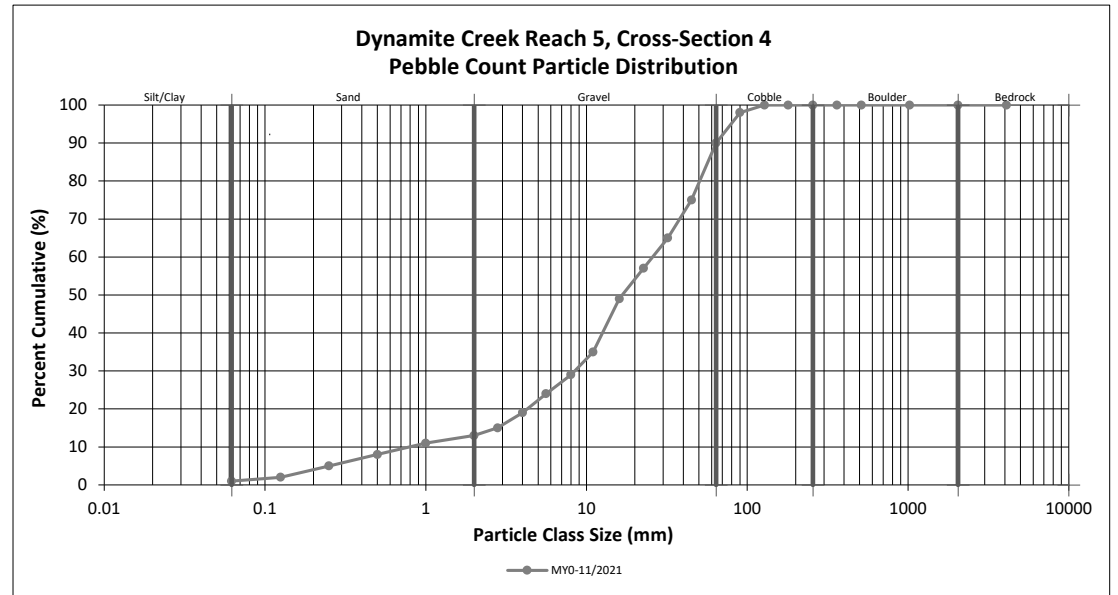
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 5, Cross-Section 4

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125	1	1	2
	Fine	0.125	0.250	3	3	5
	Medium	0.25	0.50	3	3	8
	Coarse	0.5	1.0	3	3	11
	Very Coarse	1.0	2.0	2	2	13
GRAVEL	Very Fine	2.0	2.8	2	2	15
	Very Fine	2.8	4.0	4	4	19
	Fine	4.0	5.6	5	5	24
	Fine	5.6	8.0	5	5	29
	Medium	8.0	11.0	6	6	35
	Medium	11.0	16.0	14	14	49
	Coarse	16.0	22.6	8	8	57
	Coarse	22.6	32	8	8	65
	Very Coarse	32	45	10	10	75
	Very Coarse	45	64	15	15	90
COBBLE	Small	64	90	8	8	98
	Small	90	128	2	2	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 4	
Channel materials (mm)	
D ₁₆ =	3.06
D ₃₅ =	11.00
D ₅₀ =	16.7
D ₈₄ =	55.6
D ₉₅ =	79.2
D ₁₀₀ =	128.0



Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

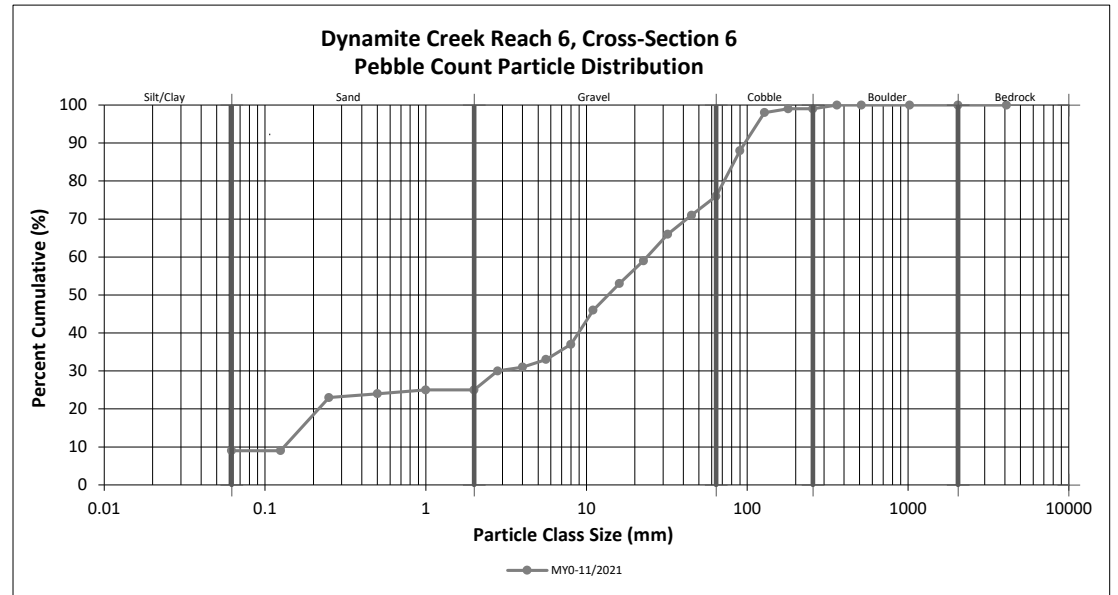
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 6, Cross-Section 6

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	9	9	9
SAND	Very fine	0.062	0.125			9
	Fine	0.125	0.250	14	14	23
	Medium	0.25	0.50	1	1	24
	Coarse	0.5	1.0	1	1	25
	Very Coarse	1.0	2.0			25
GRAVEL	Very Fine	2.0	2.8	5	5	30
	Very Fine	2.8	4.0	1	1	31
	Fine	4.0	5.6	2	2	33
	Fine	5.6	8.0	4	4	37
	Medium	8.0	11.0	9	9	46
	Medium	11.0	16.0	7	7	53
	Coarse	16.0	22.6	6	6	59
	Coarse	22.6	32	7	7	66
	Very Coarse	32	45	5	5	71
	Very Coarse	45	64	5	5	76
COBBLE	Small	64	90	12	12	88
	Small	90	128	10	10	98
	Large	128	180	1	1	99
	Large	180	256			99
BOULDER	Small	256	362	1	1	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 6	
Channel materials (mm)	
D ₁₆ =	0.18
D ₃₅ =	6.69
D ₅₀ =	13.6
D ₈₄ =	80.3
D ₉₅ =	115.2
D ₁₀₀ =	362.0



Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

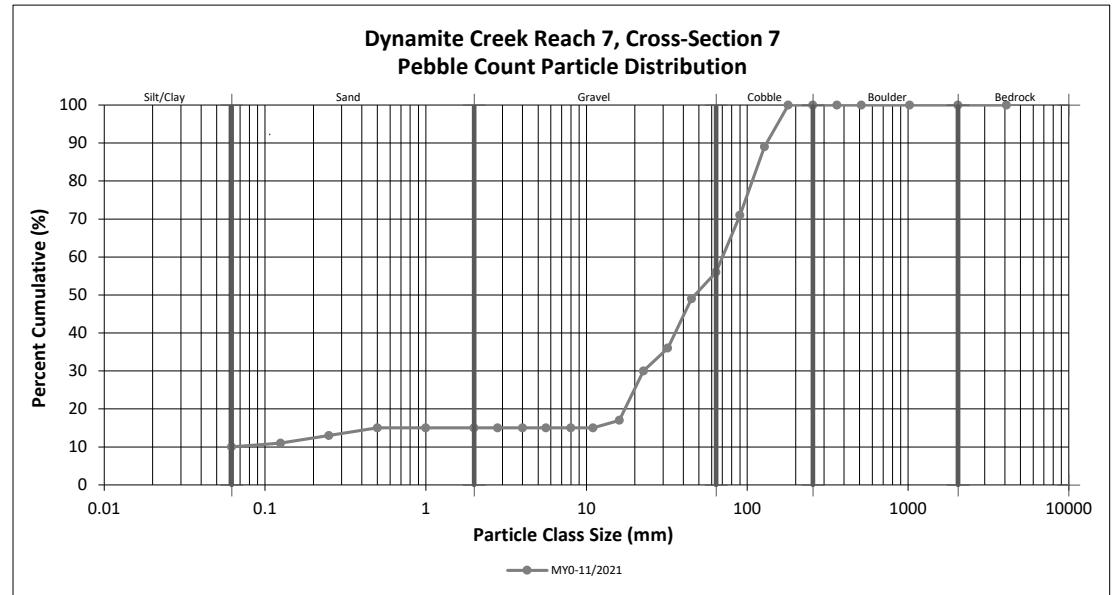
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 7, Cross-Section 7

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	10	10	10
SAND	Very fine	0.062	0.125	1	1	11
	Fine	0.125	0.250	2	2	13
	Medium	0.25	0.50	2	2	15
	Coarse	0.5	1.0			15
	Very Coarse	1.0	2.0			15
GRAVEL	Very Fine	2.0	2.8			15
	Very Fine	2.8	4.0			15
	Fine	4.0	5.6			15
	Fine	5.6	8.0			15
	Medium	8.0	11.0			15
	Medium	11.0	16.0	2	2	17
	Coarse	16.0	22.6	13	13	30
	Coarse	22.6	32	6	6	36
	Very Coarse	32	45	13	13	49
	Very Coarse	45	64	7	7	56
COBBLE	Small	64	90	15	15	71
	Small	90	128	18	18	89
	Large	128	180	11	11	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 7	
Channel materials (mm)	
D ₁₆ =	13.27
D ₃₅ =	30.20
D ₅₀ =	47.3
D ₈₄ =	116.1
D ₉₅ =	154.2
D ₁₀₀ =	180.0



Cross-Section Pebble Count Plots

Dynamite Creek Mitigation Site

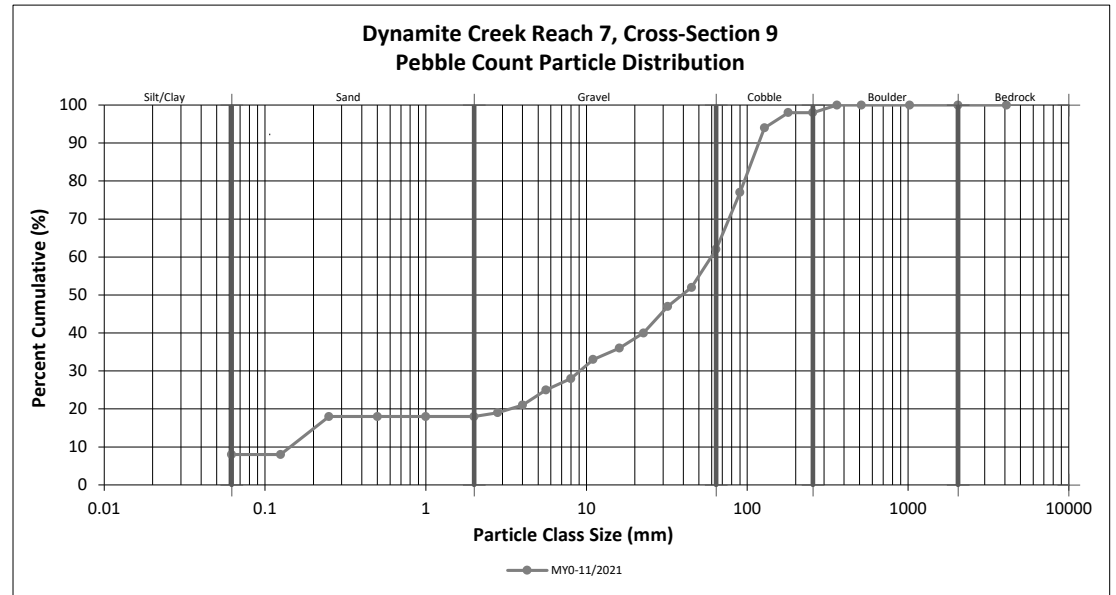
DMS Project No. 100125

Monitoring Year 0 - 2022

Dynamite Creek Reach 7, Cross-Section 9

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	8	8	8
SAND	Very fine	0.062	0.125			8
	Fine	0.125	0.250	10	10	18
	Medium	0.25	0.50			18
	Coarse	0.5	1.0			18
	Very Coarse	1.0	2.0			18
GRAVEL	Very Fine	2.0	2.8	1	1	19
	Very Fine	2.8	4.0	2	2	21
	Fine	4.0	5.6	4	4	25
	Fine	5.6	8.0	3	3	28
	Medium	8.0	11.0	5	5	33
	Medium	11.0	16.0	3	3	36
	Coarse	16.0	22.6	4	4	40
	Coarse	22.6	32	7	7	47
	Very Coarse	32	45	5	5	52
	Very Coarse	45	64	10	10	62
COBBLE	Small	64	90	15	15	77
	Small	90	128	17	17	94
	Large	128	180	4	4	98
	Large	180	256			98
BOULDER	Small	256	362	2	2	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 9	
Channel materials (mm)	
D ₁₆ =	0.22
D ₃₅ =	14.12
D ₅₀ =	39.3
D ₈₄ =	104.0
D ₉₅ =	139.4
D ₁₀₀ =	362.0



APPENDIX D. PROJECT TIMELINE AND CONTACT INFO

Table 10. Project Activity and Reporting History

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Project Instituted		NA	May 2019
Mitigation Plan Approved		NA	February 2021
Construction (Grading) Completed		NA	November 2021
As-Built Survey Completed		December 2021	December 2021
Planting Completed		NA	January 2022
Baseline Monitoring Document (Year 0)	Stream Survey	November 2021	March 2022
	Vegetation Survey	January 2022	
Year 1 Monitoring	Stream Survey	2022	December 2022
	Vegetation Survey	2022	
Year 2 Monitoring	Stream Survey	2023	December 2023
	Vegetation Survey	2023	
Year 3 Monitoring	Stream Survey	2024	December 2024
	Vegetation Survey	2024	
Year 4 Monitoring		2025	December 2025
Year 5 Monitoring	Stream Survey	2026	December 2026
	Vegetation Survey	2026	
Year 6 Monitoring		2027	December 2027
Year 7 Monitoring	Stream Survey	2028	December 2028
	Vegetation Survey	2028	

Table 11. Project Contact Table

Dynamite Creek Mitigation Site

DMS Project No. 100125

Monitoring Year 0 - 2022

Designer Angela Allen, PE	Wildlands Engineering, Inc. 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	Wildlands Construction 312 West Millbrook Road, Suite 225 Raleigh, NC 27609
Monitoring Performers Monitoring, POC	Wildlands Engineering, Inc. Jason Lorch 919.851.9986

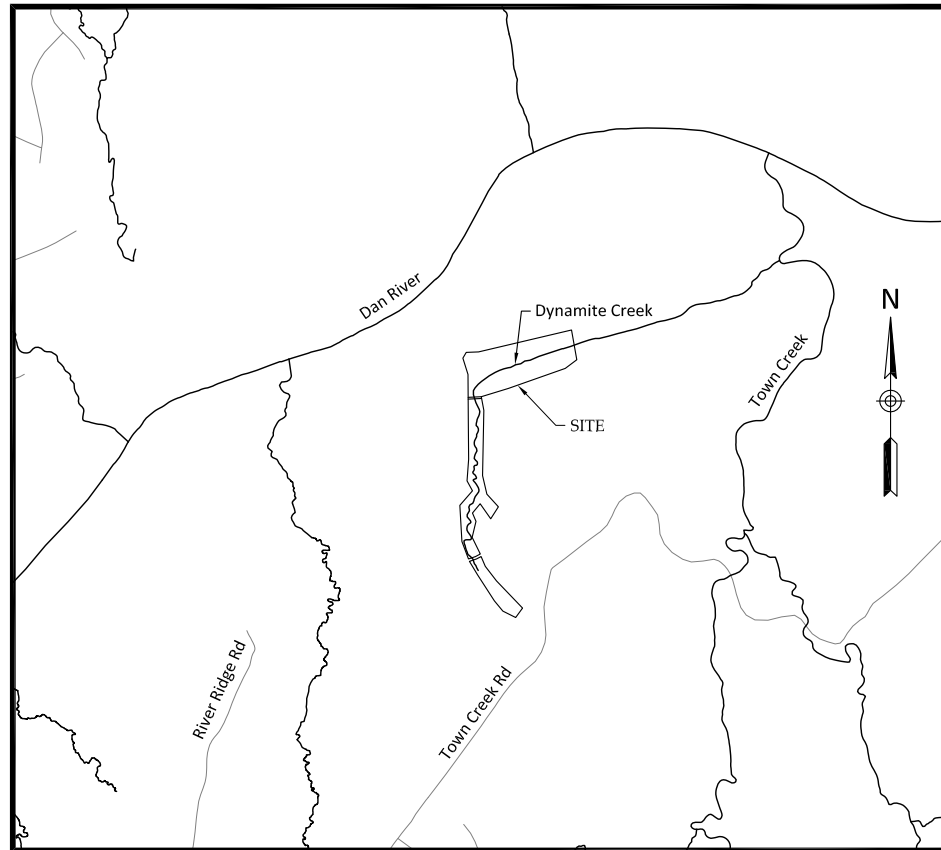
APPENDIX E. RECORD DRAWINGS

Dynamite Creek Mitigation Site

Roanoke River Basin 03010103

for NCDENR

Division of Mitigation Services



Vicinity Map
Not to Scale



AS-BUILT AND RECORD
DRAWINGS
MAY 10, 2022

Project Location

36°29'3.32" N , 79°42'39.31" W

Sheet Index

Title Sheet	0.1
Project Overview	0.2
General Notes and Symbols	0.3
Stream Plan and Profile	1.1-1.14
Additional Grading	2.0-2.2
Planting	3.0-3.1
Fencing	4.0 - 4.1

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 W. Millbrook Rd, Suite 225
Raleigh, NC 27609
Angela Allen, PE, Project Engineer
Richard Wright, EI, Project Designer
919-851-9986

Surveying:
IPW Surveying and Engineering, PLLC
Firm #: P-2249
P.O. Box 40968
Charleston, SC 29423
M. Hart Weatherford, PE, PLS, CFM
843-308-0524 x228

Owner:
NCDEQ DMS
1652 Mail Service Center
Raleigh, NC 27699-1652
Attention: Jeremiah Dow
919-707-8976

NCDEQ Contract No. 7911
DMS ID No. 100125
DWR No. 20190868
USACE Action ID No. 2019-00909

CERTIFICATE OF SURVEY
AND
ACCURACY

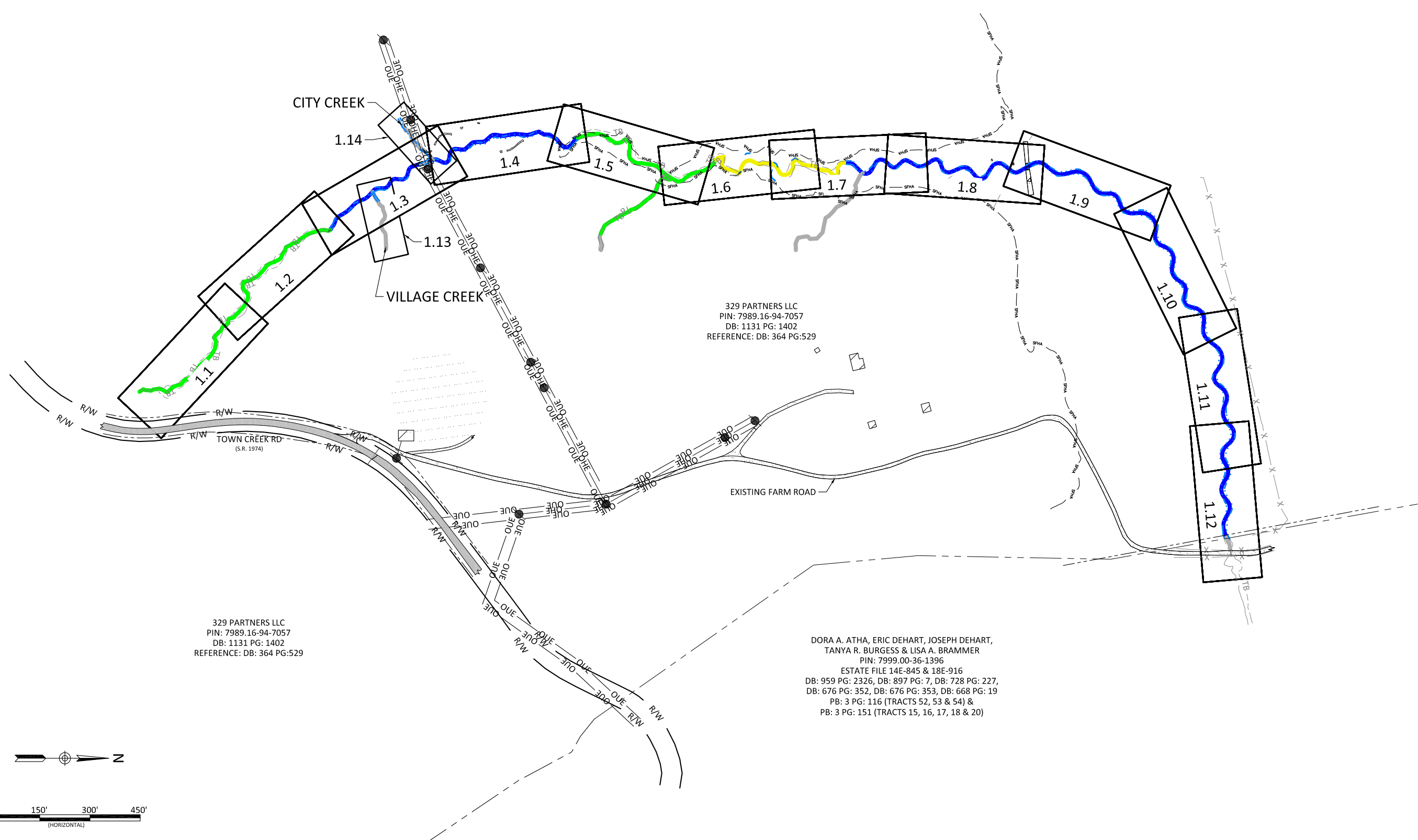
I, M. H. WEATHERFORD, PE, PLS CFM, CERTIFY THAT THE GROUND TOPOGRAPHIC SURVEY FOR THIS PROJECT WAS COMPLETED UNDER MY DIRECT SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY DIRECT SUPERVISION, THAT THE RECORD DRAWINGS WERE PREPARED BY WILDLANDS ENGINEERING, INC FROM DIGITAL FILES AND CONTOUR DATA PROVIDED BY IPW SURVEYING AND ENGINEERING, PLLC, LICENSE P-2249 AS SHOWN ON AN AS-BUILT SURVEY FOR " WILDLANDS ENGINEERING, INC., DYNAMITE CREEK MITIGATION SITE ", DATED DECEMBER 14, 2021; THAT THIS SURVEY WAS PERFORMED AT THE 95% CONFIDENCE LEVEL TO MEET THE FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS FOR A TOPOGRAPHIC SURVEY TO THE ACCURACY OF CLASS A HORIZONTAL AND CLASS B VERTICAL WHERE APPLICABLE; THAT THE ORIGINAL DATA WAS OBTAIN BETWEEN THE DATES OF 11/05/21 - 12/14/21; THAT THE CONTOURS SHOWN AS BROKEN LINES MAY NOT MEET THE STATED STANDARD AND THAT ALL COORDINATES ARE BASED ON NAD 83 (NSRS 2011) AND ALL ELEVATIONS ARE BASED ON NAVD 88; THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED AND DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 10 DAY OF May, 2022.

MARION H. WEATHERFORD, P.L.S. #L-4515



Revisions:	DATE	BY	REVISIONS
05/09/22	REV 1	ADRESSED COMMENTS AND UPDATED SURFACE	

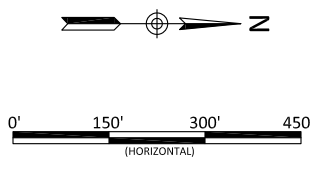
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



329 PARTNERS LLC
 PIN: 7989.16-94-7057
 DB: 1131 PG: 1402
 REFERENCE: DB: 364 PG:529

329 PARTNERS LLC
 PIN: 7989.16-94-7057
 DB: 1131 PG: 1402
 REFERENCE: DB: 364 PG:529

DORA A. ATHA, ERIC DEHART, JOSEPH DEHART,
 TANYA R. BURGESS & LISA A. BRAMMER
 PIN: 7999.00-36-1396
 ESTATE FILE 14E-845 & 18E-916
 DB: 959 PG: 2326, DB: 897 PG: 7, DB: 728 PG: 227,
 DB: 676 PG: 352, DB: 676 PG: 353, DB: 668 PG: 19
 PB: 3 PG: 116 (TRACTS 52, 53 & 54) &
 PB: 3 PG: 151 (TRACTS 15, 16, 17, 18 & 20)



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Project Overview

Revisions:

Date: 07/14/21
 Job Number: 005-02184
 Project Engineer: ANA
 Drawn By: RHW
 Checked By: NMM

0.2

Existing Features

	FEMA XS	FEMA CROSS SECTIONS
	FEMA	FEMA 100 YR FLOODPLAIN BOUNDARY
	FEMA FP	FEMA 500 YR FLOODPLAIN BOUNDARY
	FFW	FEMA FLOODWAY
	TB	EXISTING TOP OF BANK
	X X	EXISTING FENCE
		EXISTING STORM PIPE
		EXISTING PROPERTY LINE
	OHE	OVERHEAD ELECTRIC
	OUE	OVERHEAD ELECTRIC UTILITY EASEMENT
		EXISTING TREE LINE
	CE	EXISTING CONSERVATION EASEMENT
	CE-IX	EXISTING CONSERVATION EASEMENT INTERNAL CROSSING
		EXISTING BEDROCK
		EXISTING FARM PATH
		EXISTING WETLAND
		EXISTING UTILITY POLE
		EXISTING GUY WIRE

AS-DESIGNED Features

	10+00	AS-DESIGNED NOT FOR CREDIT
	10+00	AS-DESIGNED PRESERVATION REACH
	10+00	AS-DESIGNED ENHANCEMENT I REACH
	10+00	AS-DESIGNED ENHANCEMENT II REACH
	10+00	AS-DESIGNED RESTORATION REACH
		AS-DESIGNED BANKFULL
	100	AS-DESIGNED MAJOR CONTOUR
		AS-DESIGNED MINOR CONTOUR
		AS-DESIGNED LOG VANE
		AS-DESIGNED LOG SILL
		AS-DESIGNED ROCK SILL
		AS-DESIGNED LOG J-SILL
		AS-DESIGNED BOULDER TOE
		AS-DESIGNED LUNKER LOG
		AS-DESIGNED ROCK OUTLET
		AS-DESIGNED ANGLED LOG RIFFLE
		AS-DESIGNED STREAM BANK GRADING
		AS-DESIGNED FORD CROSSING
		AS-DESIGNED BRUSH TOE
		AS-DESIGNED VEGETATED SOIL LIFT
		AS-DESIGNED EARTHEN VALLEY SILL
		AS-DESIGNED 4 STRAND HIGH TENSILE FENCE 1' OFFSET OUTSIDE CE WHERE SHOWN
		AS-DESIGNED 6" WOODEN POSTS
		AS-DESIGNED 12' - 2" TUBE STEEL GATE
		AS-DESIGNED 2X 12' - 2" TUBE STEEL GATE

As-Built Features

	100	AS-BUILT MAJOR CONTOUR
	101	AS-BUILT MINOR CONTOUR
		AS-BUILT THALWEG
		AS-BUILT BANKFULL
	LOD	LIMITS OF DISTURBANCE
	XS#	CROSS SECTION
	PP ##	PHOTO POINT
	BAROTROLL GWG## CG	BAROTROLL GAUGE GROUND WATER GAUGE CREST GAUGE
	VEG VP ##	VEGETATION PLOT
		AS-BUILT LOG VANE
		AS-BUILT LOG SILL
		AS-BUILT ROCK SILL
		AS-BUILT LOG J-SILL
		AS-BUILT BOULDER TOE
		AS-BUILT LUNKER LOG
		AS-BUILT ROCK OUTLET
		AS-BUILT ANGLED LOG RIFFLE
		AS-BUILT FORD CROSSING
		AS-BUILT FARM PATH
		AS-BUILT BRUSH TOE
		AS-BUILT VEGETATED SOIL LIFT
		AS-BUILT EARTHEN VALLEY SILL
		AS-BUILT FENCE
		AS-BUILT GATE
		AS-BUILT DOUBLE GATE

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

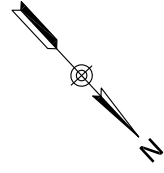
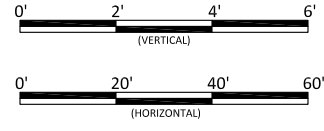
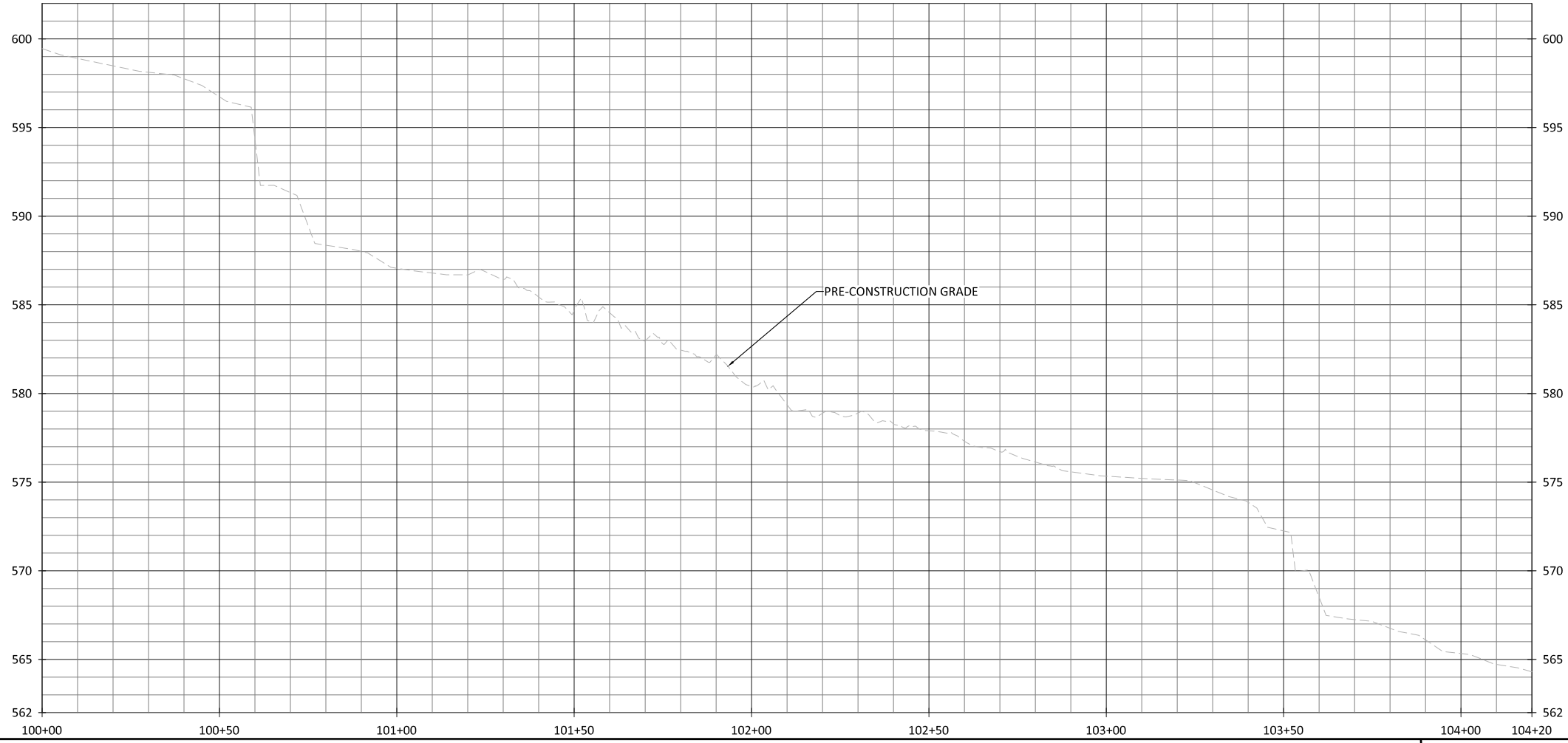


Dynamite Creek Mitigation Site Rockingham County, North Carolina

General Notes and Symbols

Revisions:	

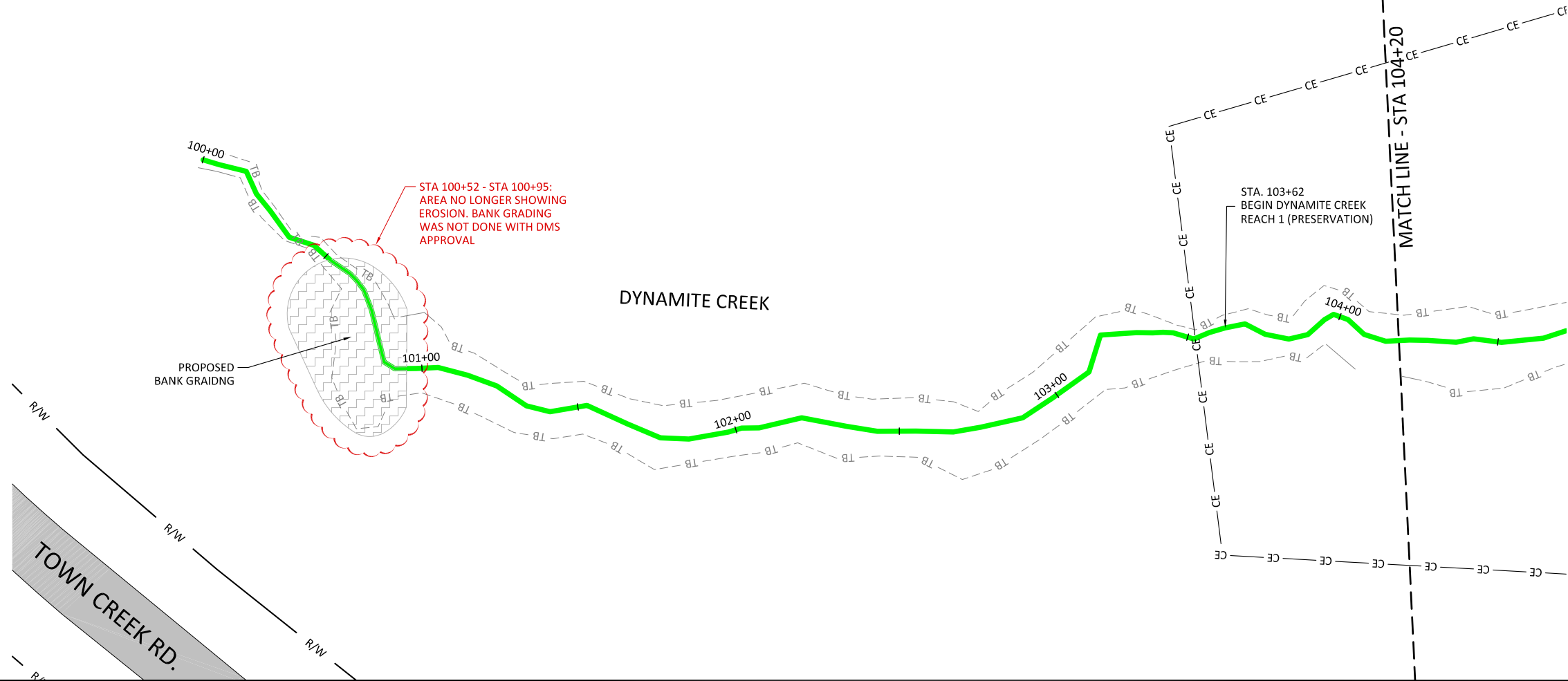
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



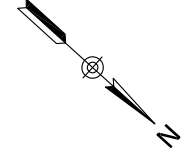
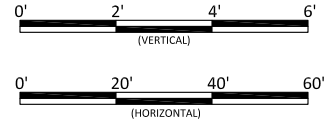
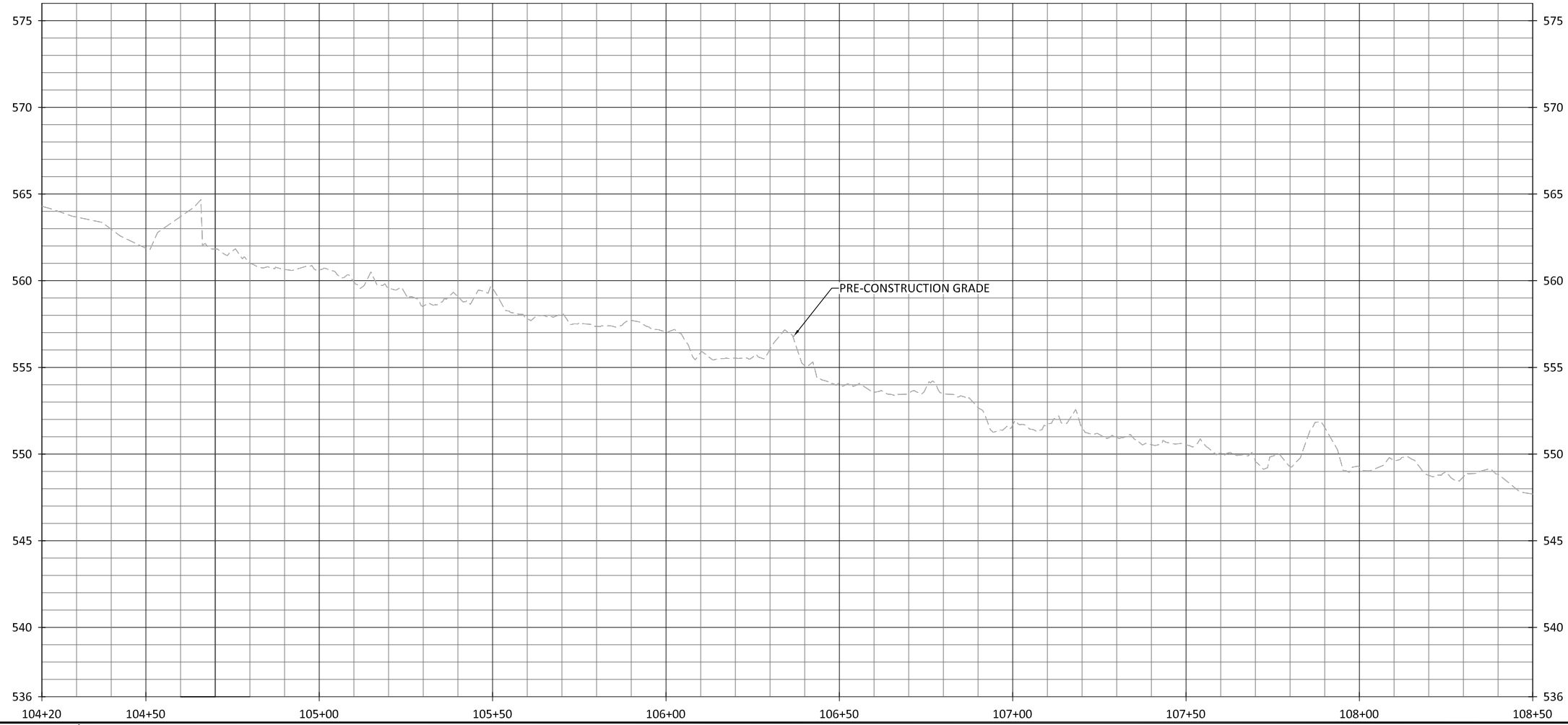
STA 100+52 - STA 100+95:
AREA NO LONGER SHOWING
EROSION. BANK GRADING
WAS NOT DONE WITH DMS
APPROVAL

STA. 103+62
BEGIN DYNAMITE CREEK
REACH 1 (PRESERVATION)

MATCH LINE - STA 104+20

Revisions:	Date:	By:	Checked By:
05/09/22 REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE	07/14/21	ANA	RHW
			NNM

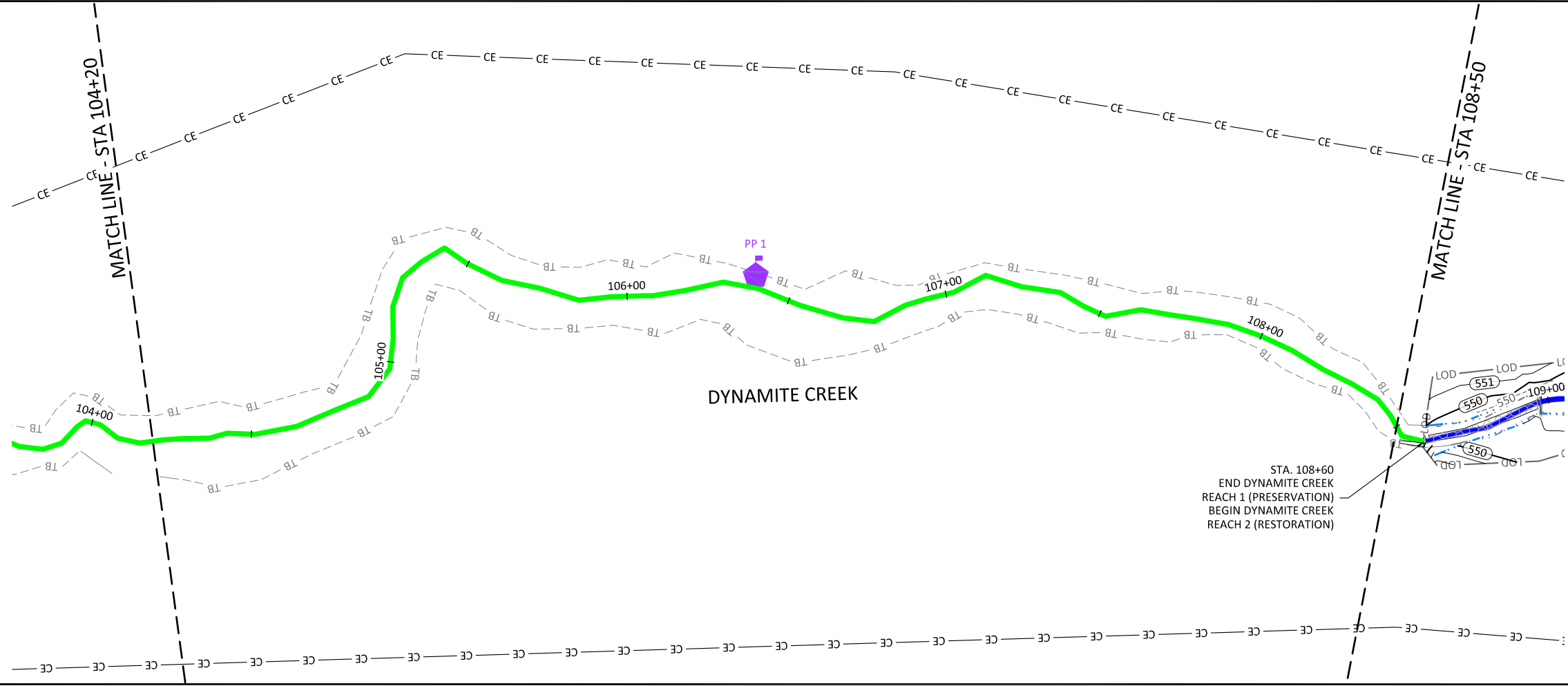
Date: 07/14/21
Job Number: 005-02184
Project Engineer: ANA
Drawn By: RHW
Checked By: NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile

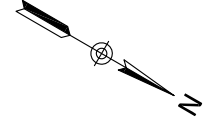
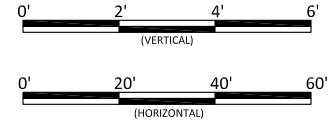
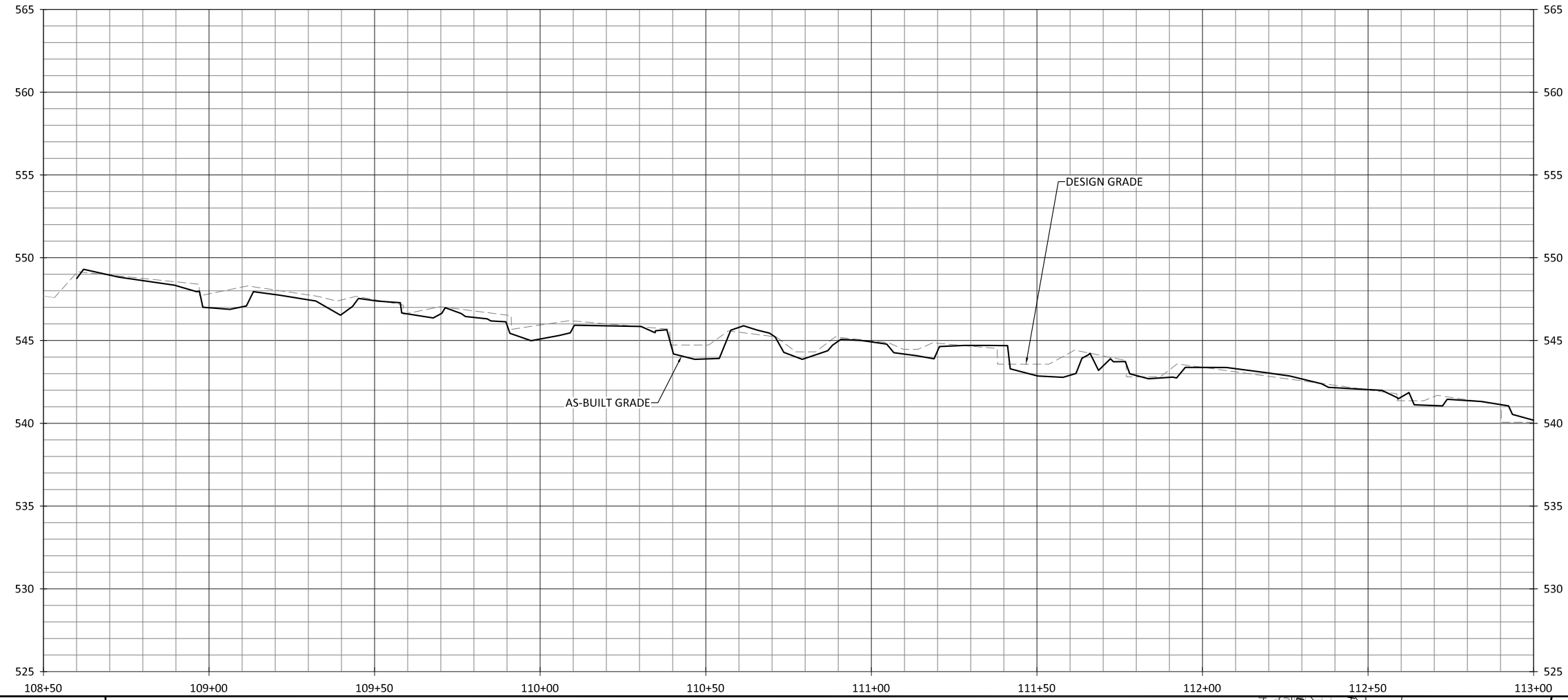
NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



Revisions:

Date	Rev	Description
05/09/22	REV 1	ADDRESSED COMMENTS AND UPDATED SURFACE

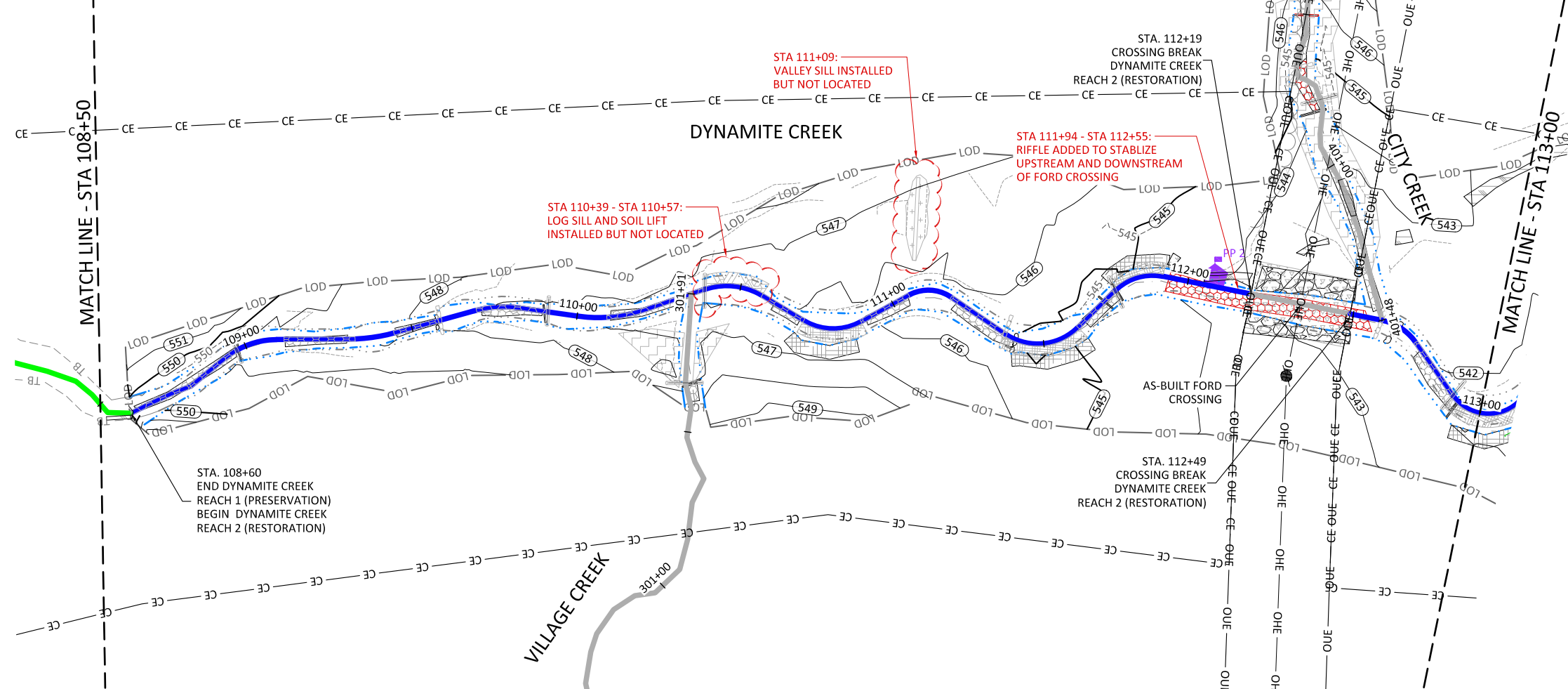
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile

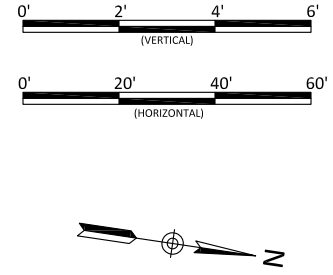
- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR VILLAGE CREEK IS ADDRESSED ON SHEET 1.13. AS-BUILT INFORMATION FOR CITY CREEK IS ADDRESSED ON SHEET 1.14.



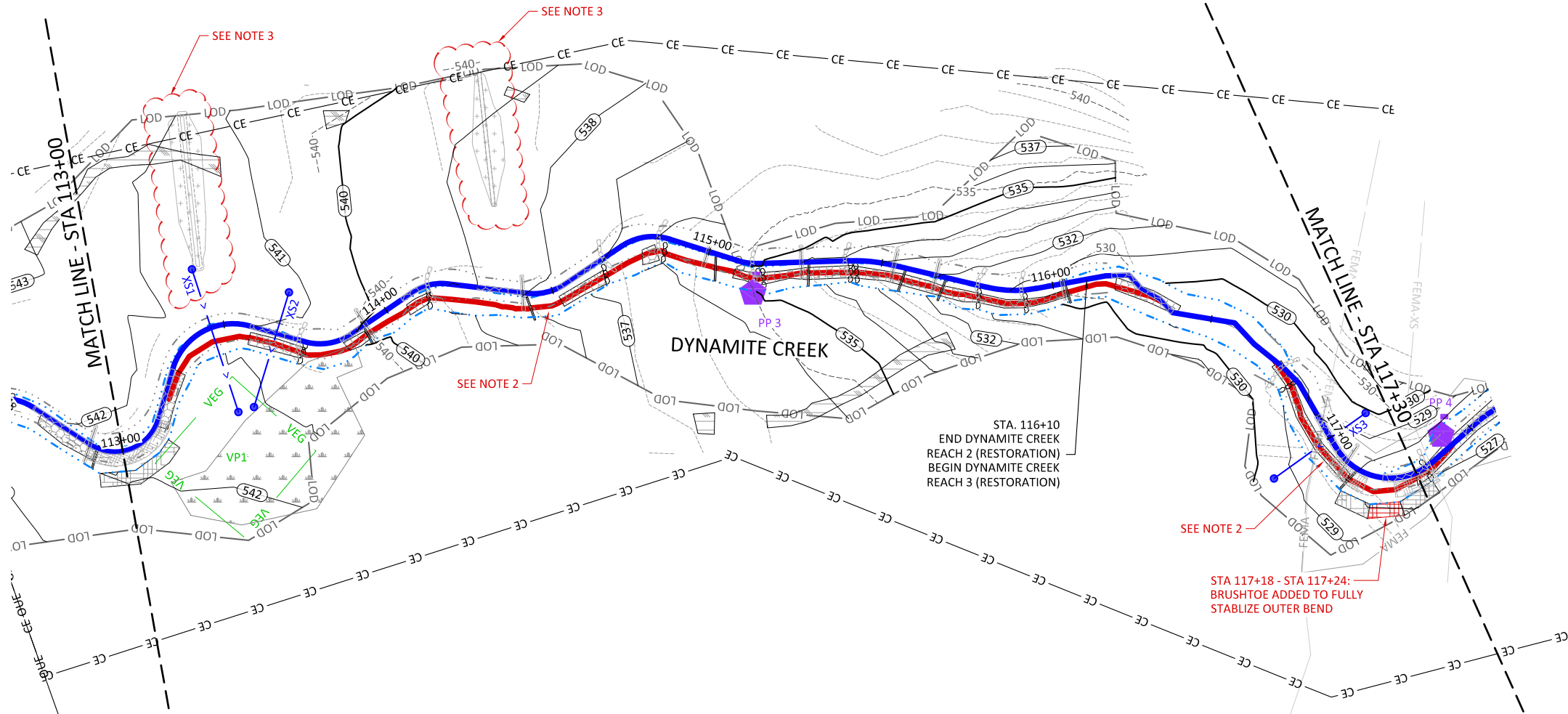
Revisions:

Date	Revised By	Comments
05/09/22	ANA	ADDRESS REV 1 COMMENTS AND UPDATED SURFACE

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina
Dynamite Creek
Stream Plan and Profile

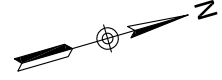
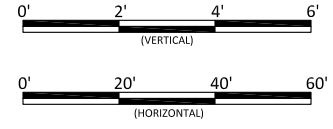
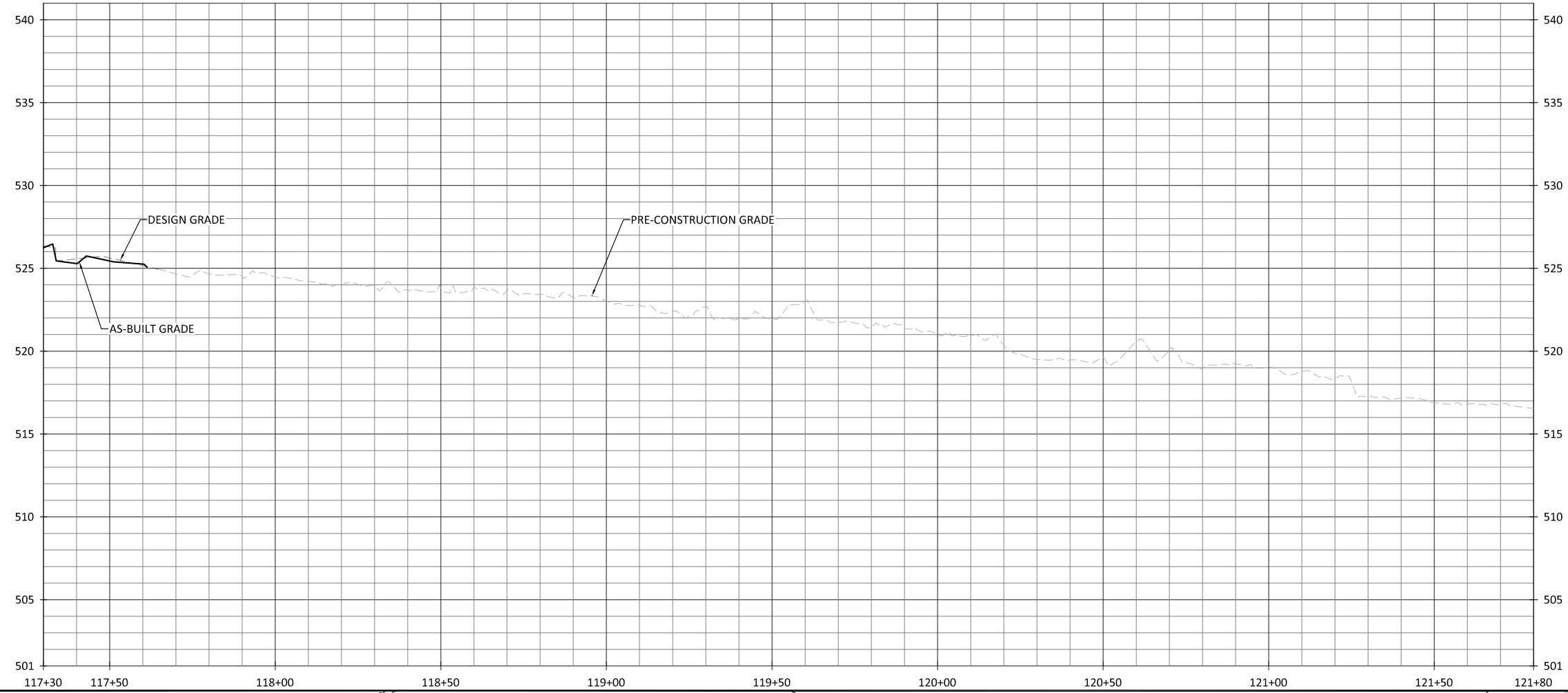


- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. STA 113+20 - STA 116+35 (308 LF) & STA 116+72 - STA 117+43 (76.5 LF): DYNAMITE CREEK ALIGNMENT CHANGED DUE TO GPS ERROR BECAUSE OF DENSE TREE CANOPY.
 3. STA 113+49 & STA 114+26: VALLEY SILLS INSTALLED BUT NOT LOCATED.

Revisions:

Date	Revised By	Comments
05/09/22	ANA	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

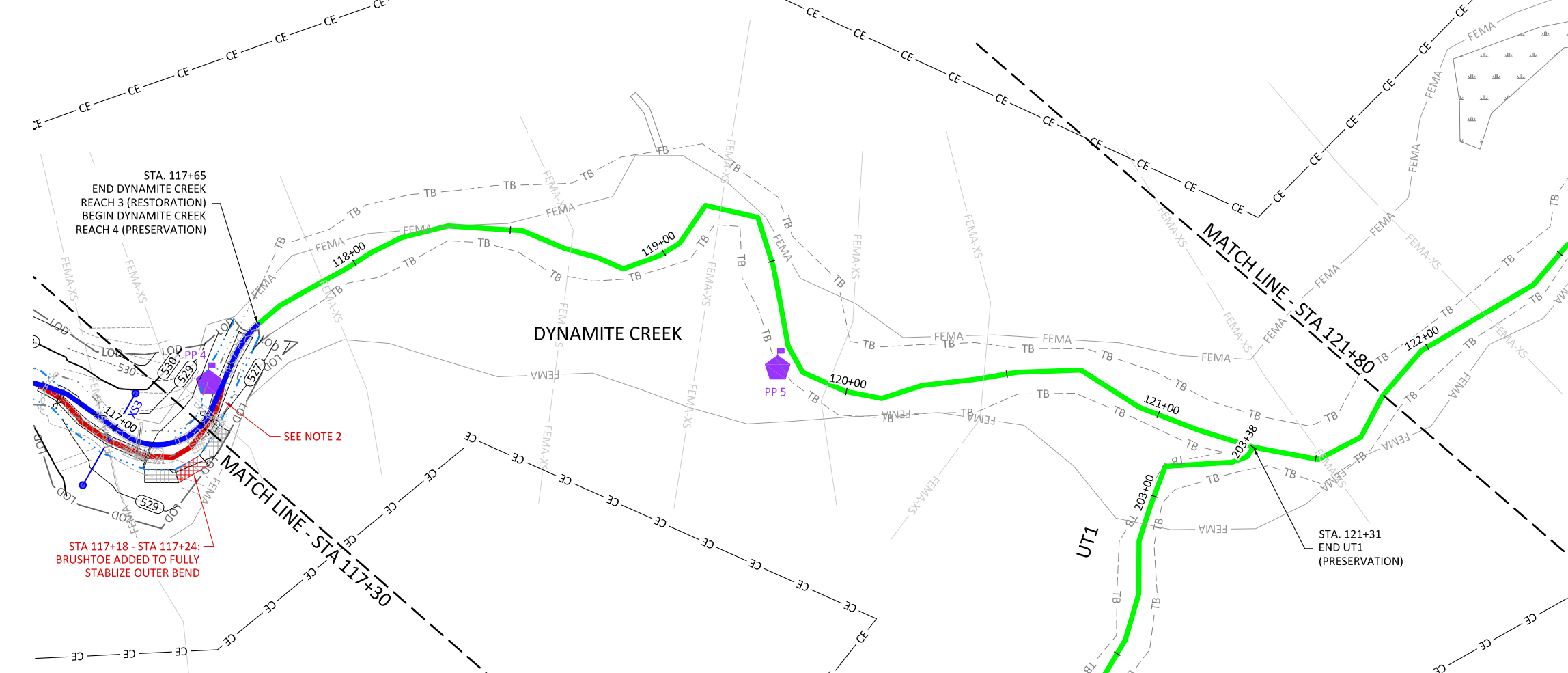
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

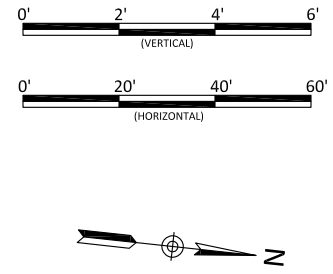
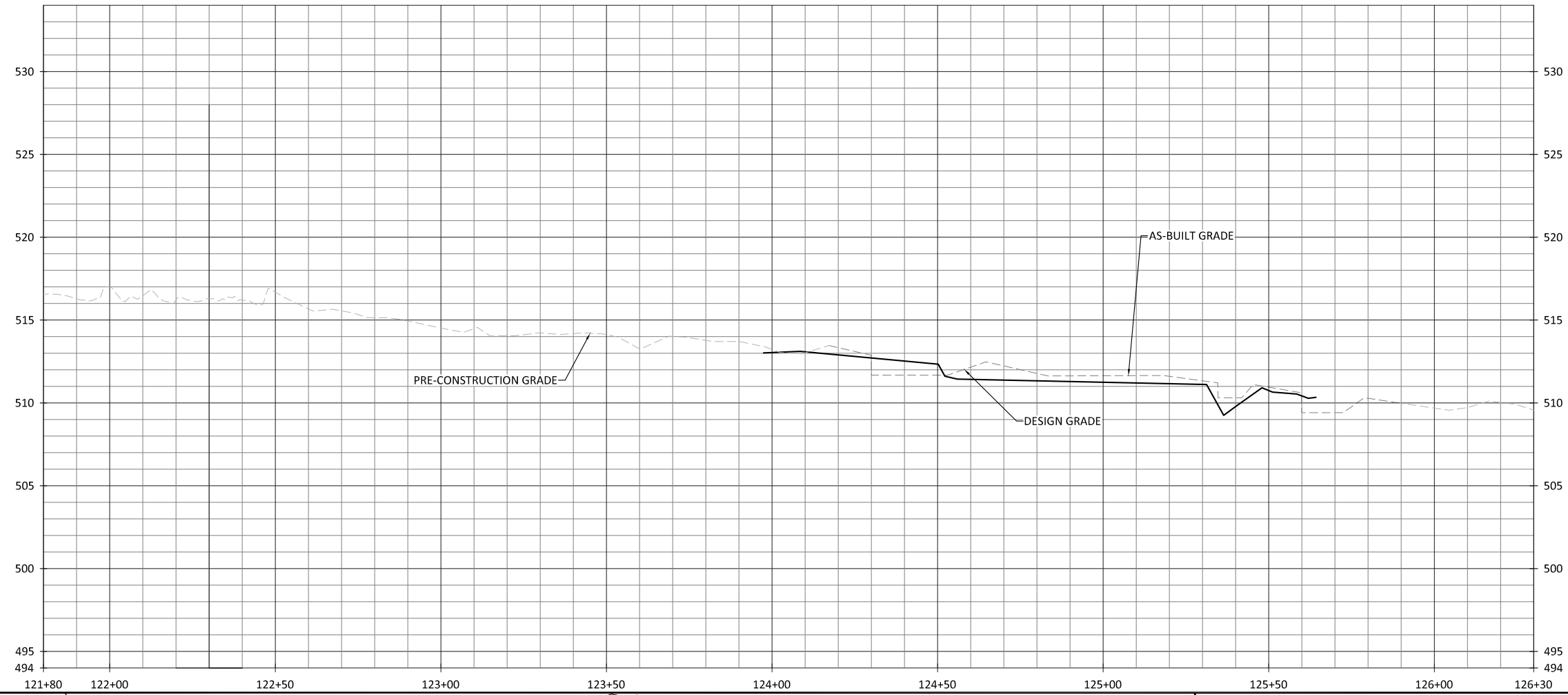
Dynamite Creek
Stream Plan and Profile

- NOTES:**
- DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 - STA 116+72 - STA 117+43 (76.5 LF): DYNAMITE CREEK ALIGNMENT CHANGED DUE TO GPS ERROR BECAUSE OF DENSE TREE CANOPY.

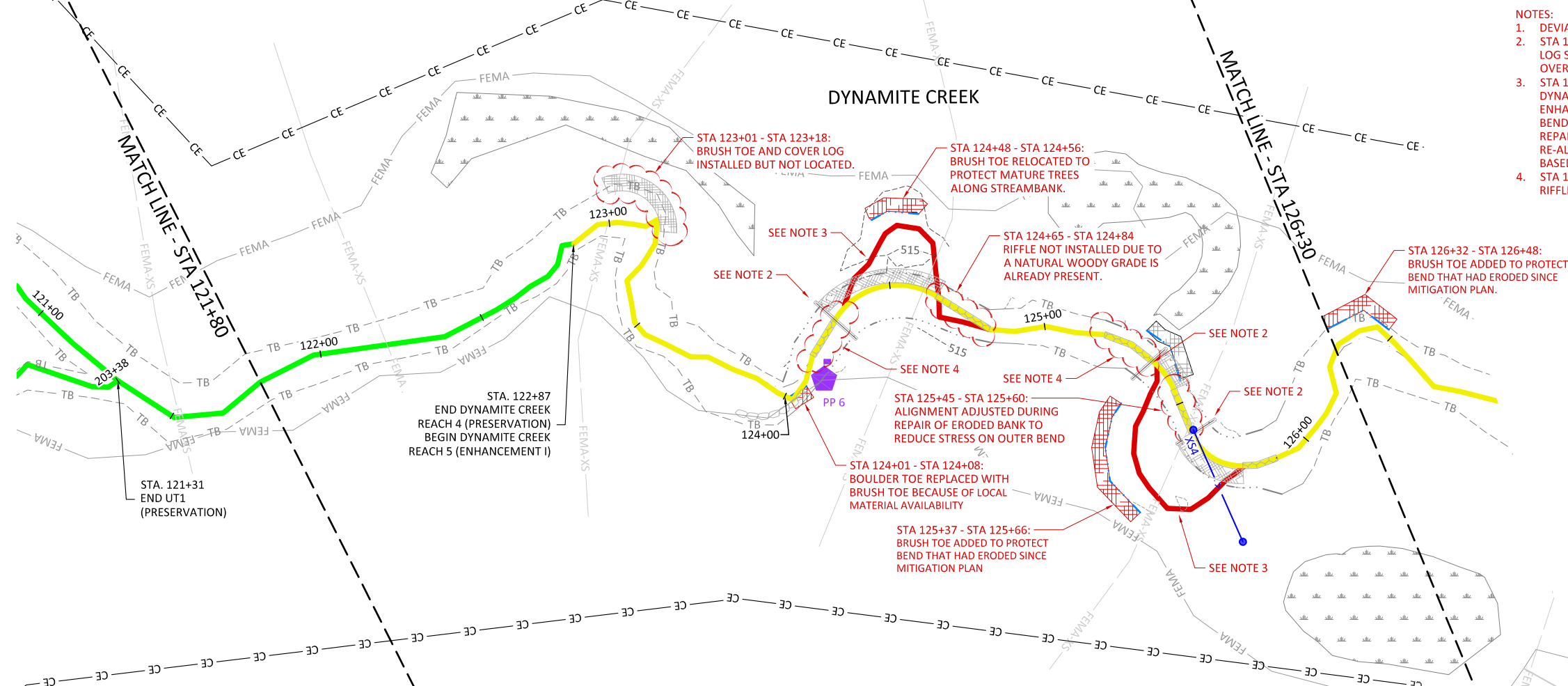


Revisions:	Date	By	Comments
05/09/22	05-02184	ANA	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE
		RHW	
		NNM	

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

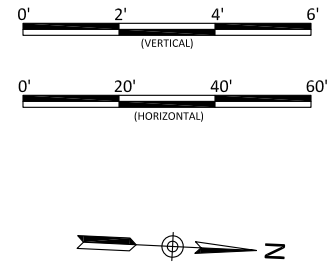
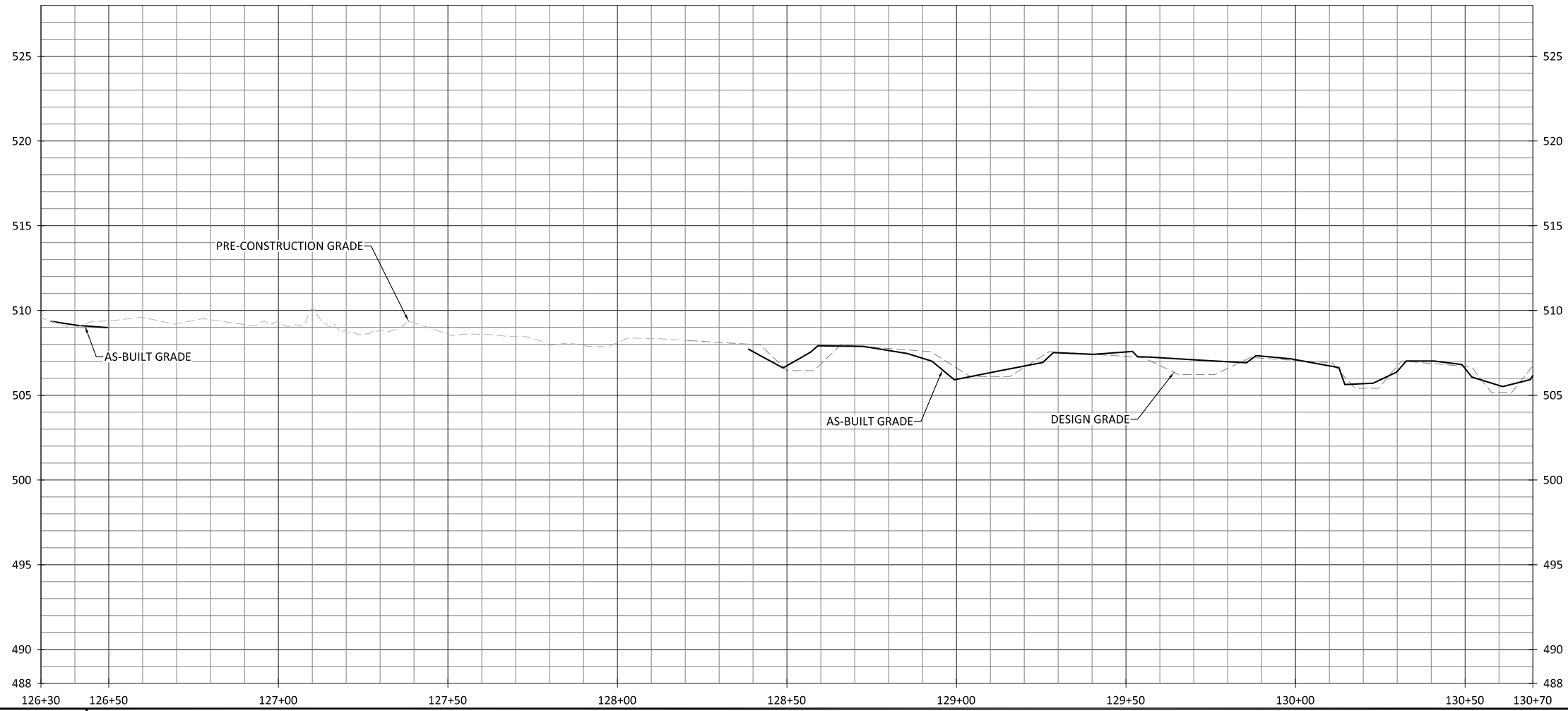


Dynamite Creek Mitigation Site
Rockingham County, North Carolina
Dynamite Creek
Stream Plan and Profile



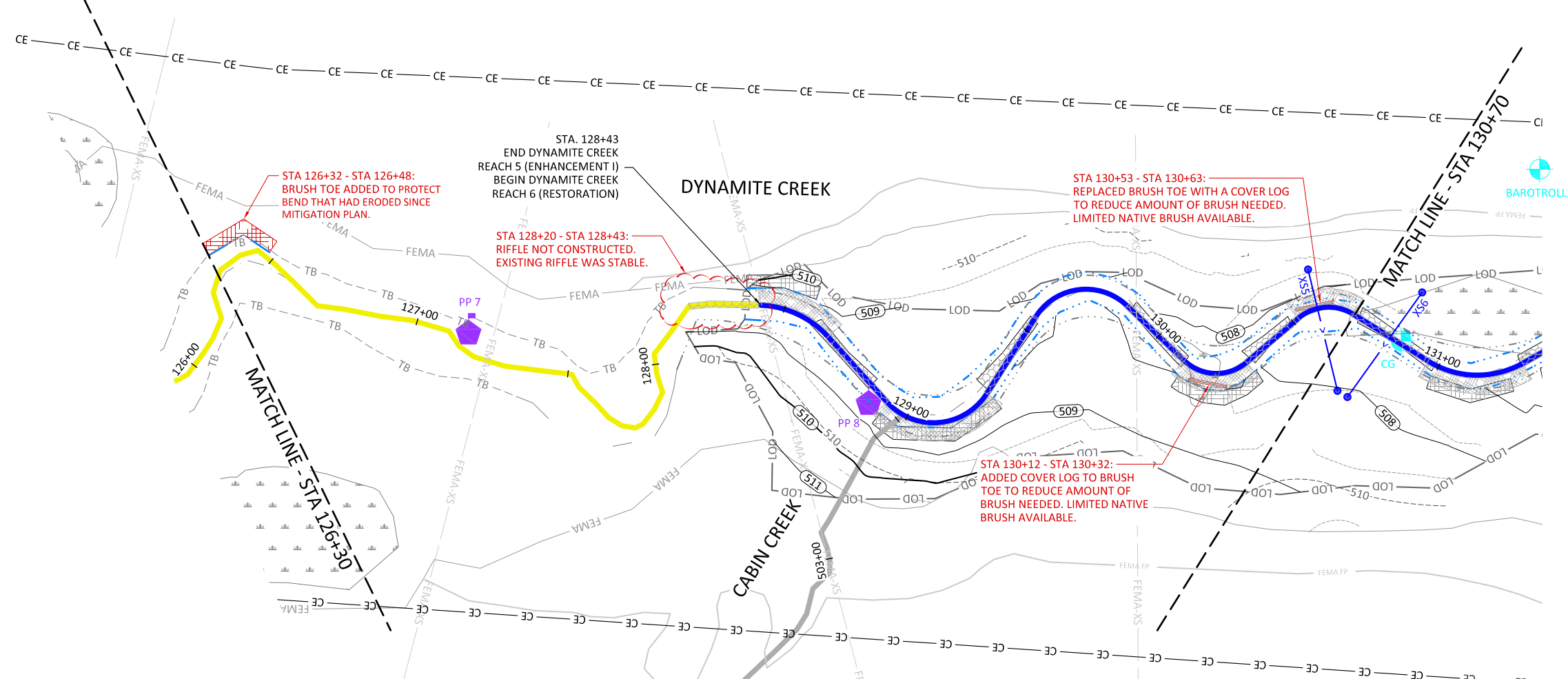
- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. STA 124+29, STA 125+35 & STA 125+59:
LOG SILLS NOT INSTALLED TO SAVE EXISTING TREES AND REDUCE OVERALL IMPACT.
 3. STA 124+35 - STA 124+83 (80 LF) & STA 125+36 - STA 125+80 (75.5 LF)
DYNAMITE CREEK REACH 5 WAS DESIGNED TO BE A LIGHT TOUCH ENHANCEMENT APPROACH WITH THE FOCUS ON REPAIRING MEANDER BENDS. TWO AREAS WERE PROPOSED FOR RE-ALIGNMENT IN ORDER TO REPAIR BENDS. THE BENDS WERE ABLE TO BE REPAIRED WITHOUT RE-ALIGNING THE ADJACENT RIFFLES. STREAM CREDITS ARE PRESENTED BASED ON THE ORIGINAL DESIGN ALIGNMENT IN THE MITIGATION PLAN.
 4. STA 124+17 - STA 124+30 & 125+18 - STA 125+34:
RIFFLES NOT INSTALLED BECAUSE CHANNEL NOT REALIGNED.

Revisions:	Date	By	Checked By
05/09/22	07/14/21	ANA	ANA
COMMENTS AND UPDATED SURFACE		RHW	NNM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

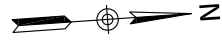
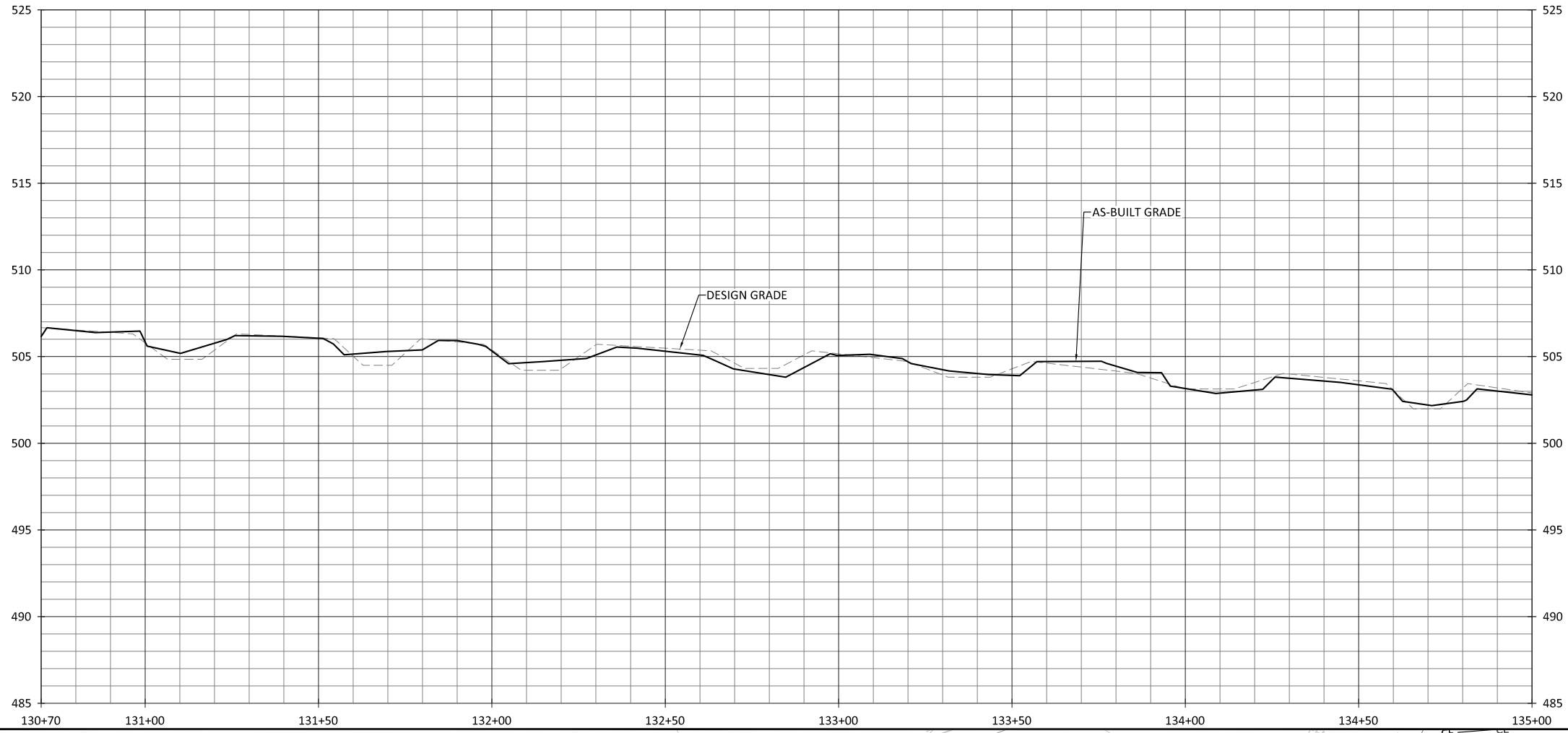
Dynamite Creek
Stream Plan and Profile



NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

Revisions:	Date:	By:	Checked By:
05/09/22 REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE	07/14/21	ANA	RHW

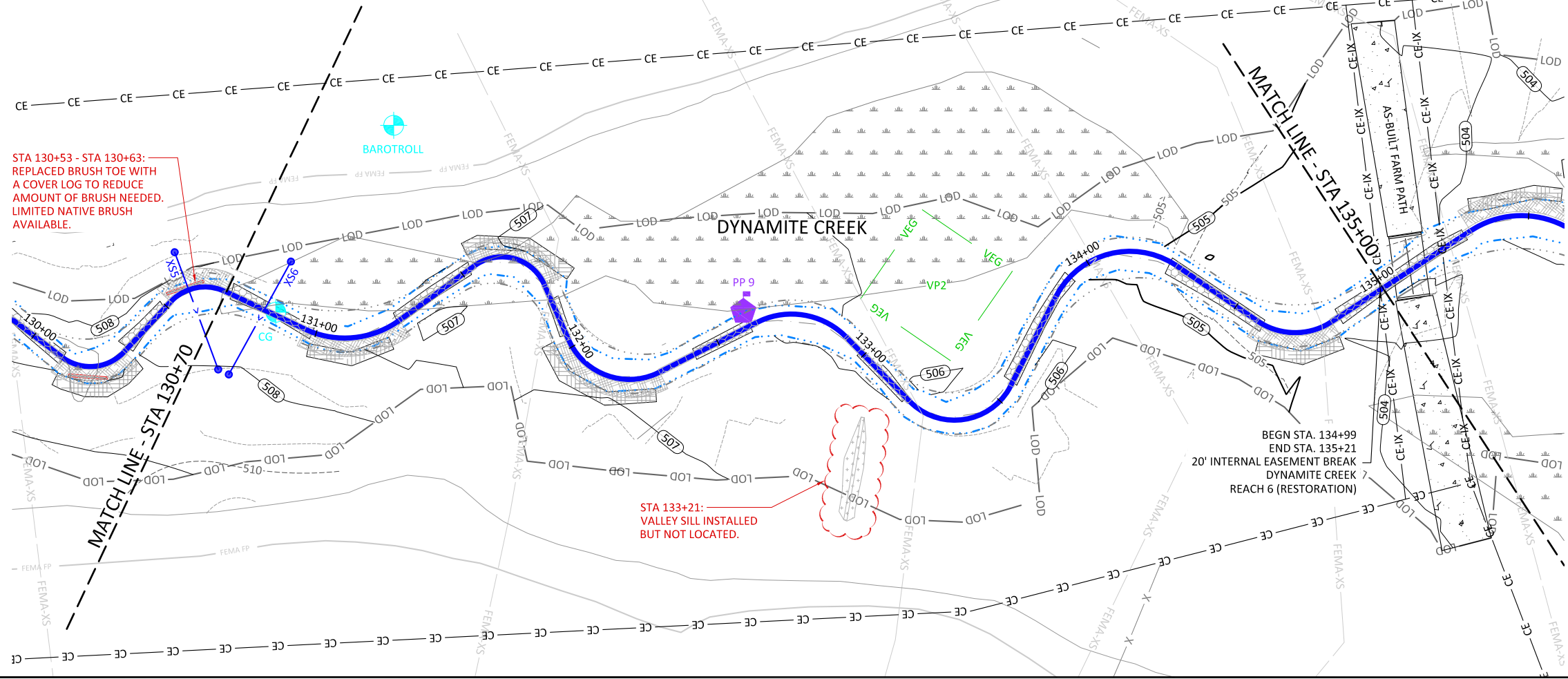
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NMM



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



STA 130+53 - STA 130+63:
REPLACED BRUSH TOE WITH
A COVER LOG TO REDUCE
AMOUNT OF BRUSH NEEDED.
LIMITED NATIVE BRUSH
AVAILABLE.

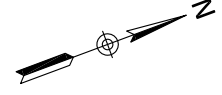
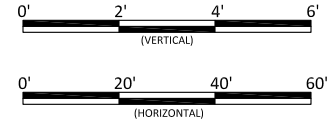
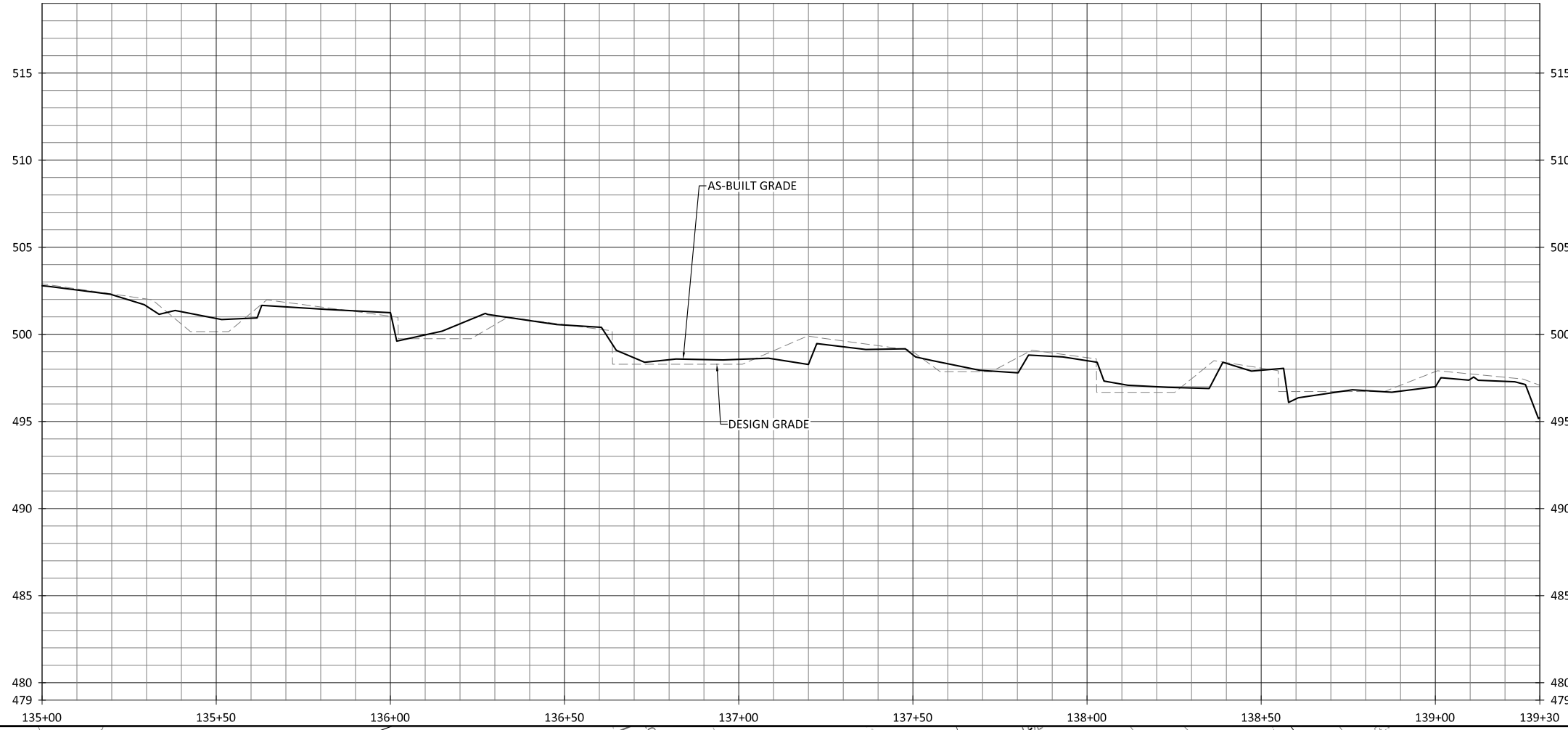
STA 133+21:
VALLEY SILL INSTALLED
BUT NOT LOCATED.

BEGN STA. 134+99
END STA. 135+21
20' INTERNAL EASEMENT BREAK
DYNAMITE CREEK 7
REACH 6 (RESTORATION)

Revisions:	Date	By	Comments
05/09/22	05-02/184	ANA	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

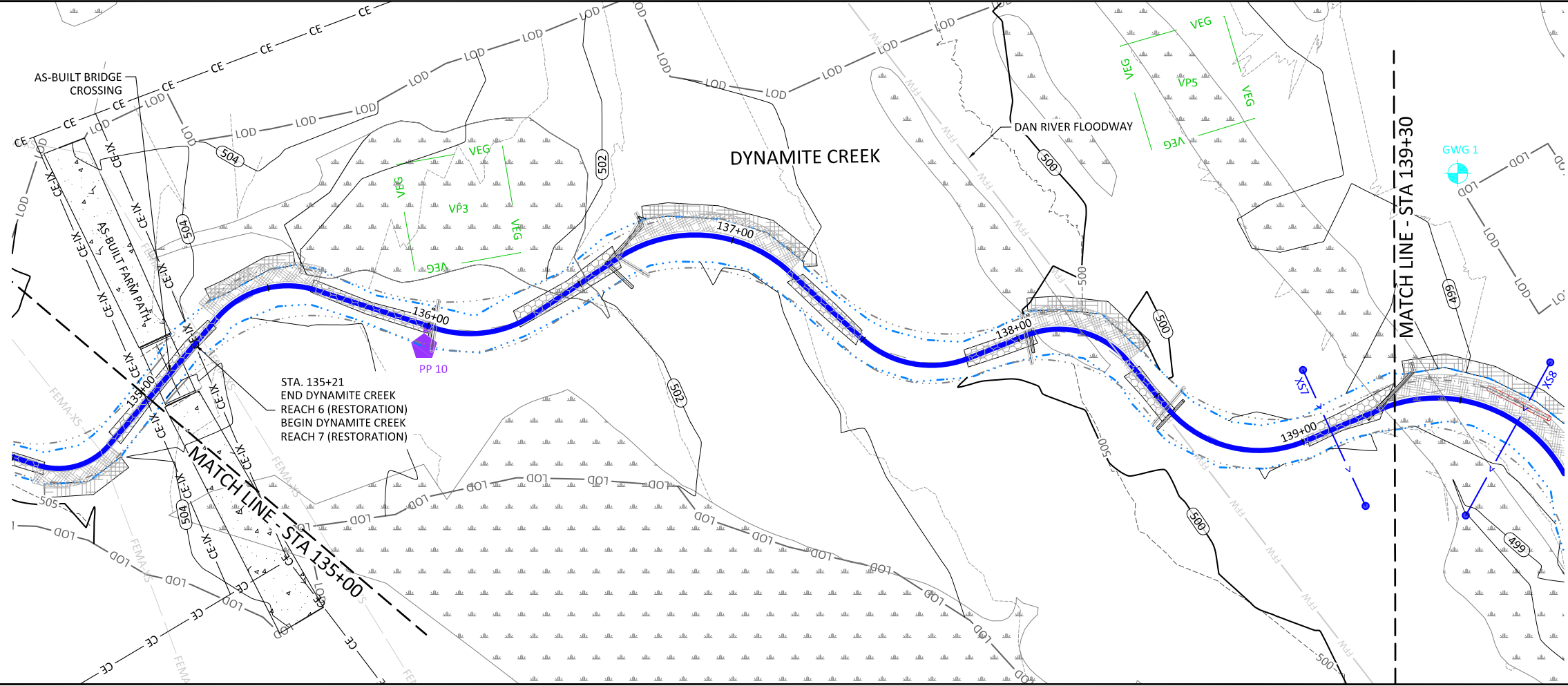
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

1.8



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile



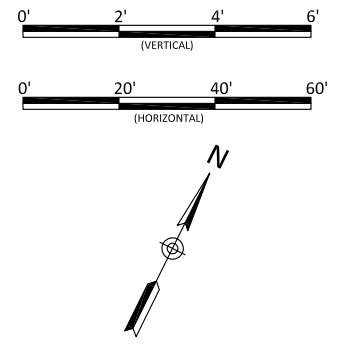
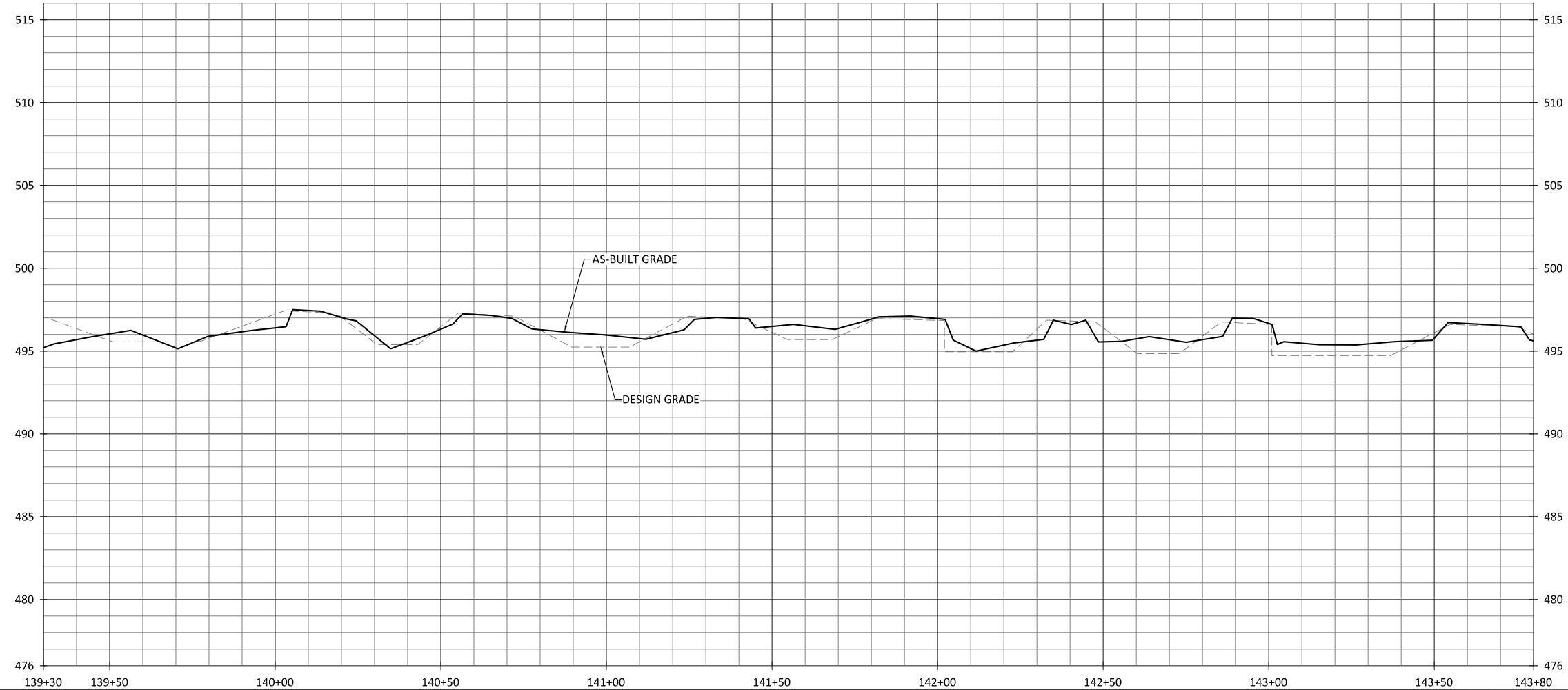
NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

Revisions:

DATE	REVISION
05/09/22	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

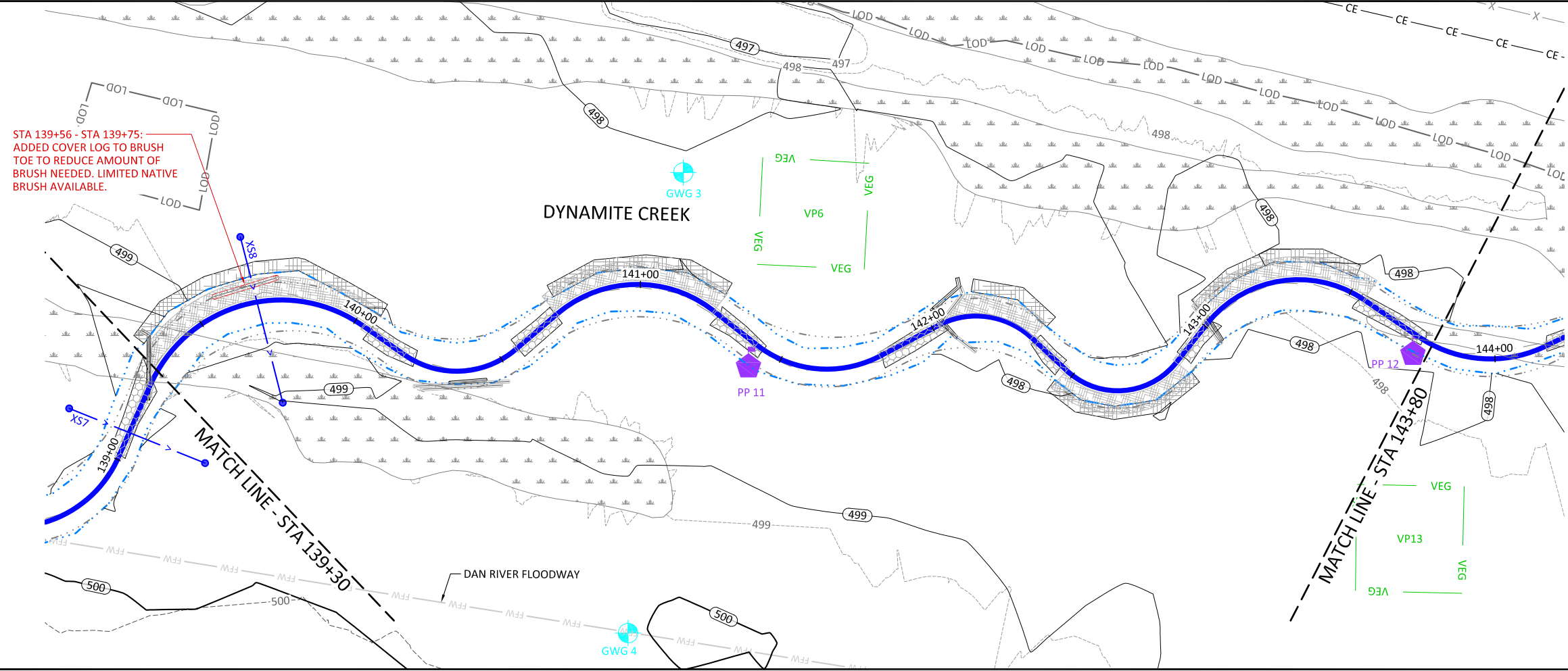
May 10, 2022



WILDLANDS
ENGINEERING
312 W. Millbrook Rd, Suite 225
Raleigh, NC 27609
Tel: 919.851.9886
License No. F-0831



Dynamite Creek Mitigation Site
Rockingham County, North Carolina
Dynamite Creek
Stream Plan and Profile



STA 139+56 - STA 139+75:
ADDED COVER LOG TO BRUSH
TOE TO REDUCE AMOUNT OF
BRUSH NEEDED. LIMITED NATIVE
BRUSH AVAILABLE.

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE
SHOWN IN RED.

X:\Shared Projects\005-02184-Dynamite Creek_Monitoring_BaseLine_2021\Plans\02184-AB-Dynamite Creek.dwg

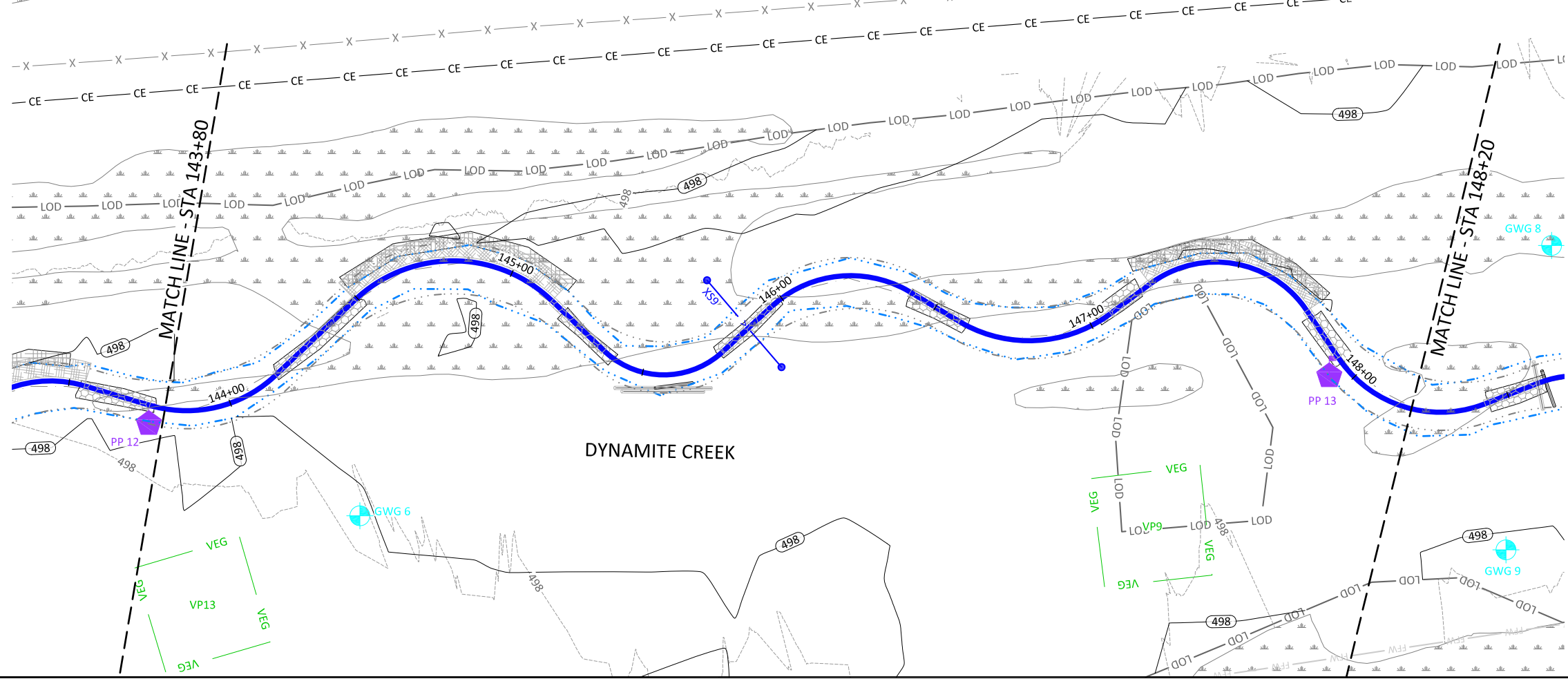
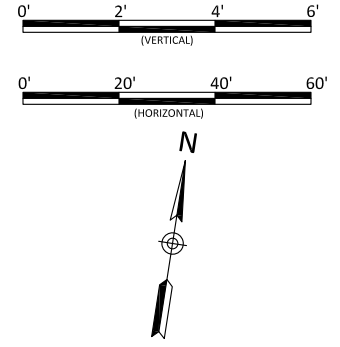
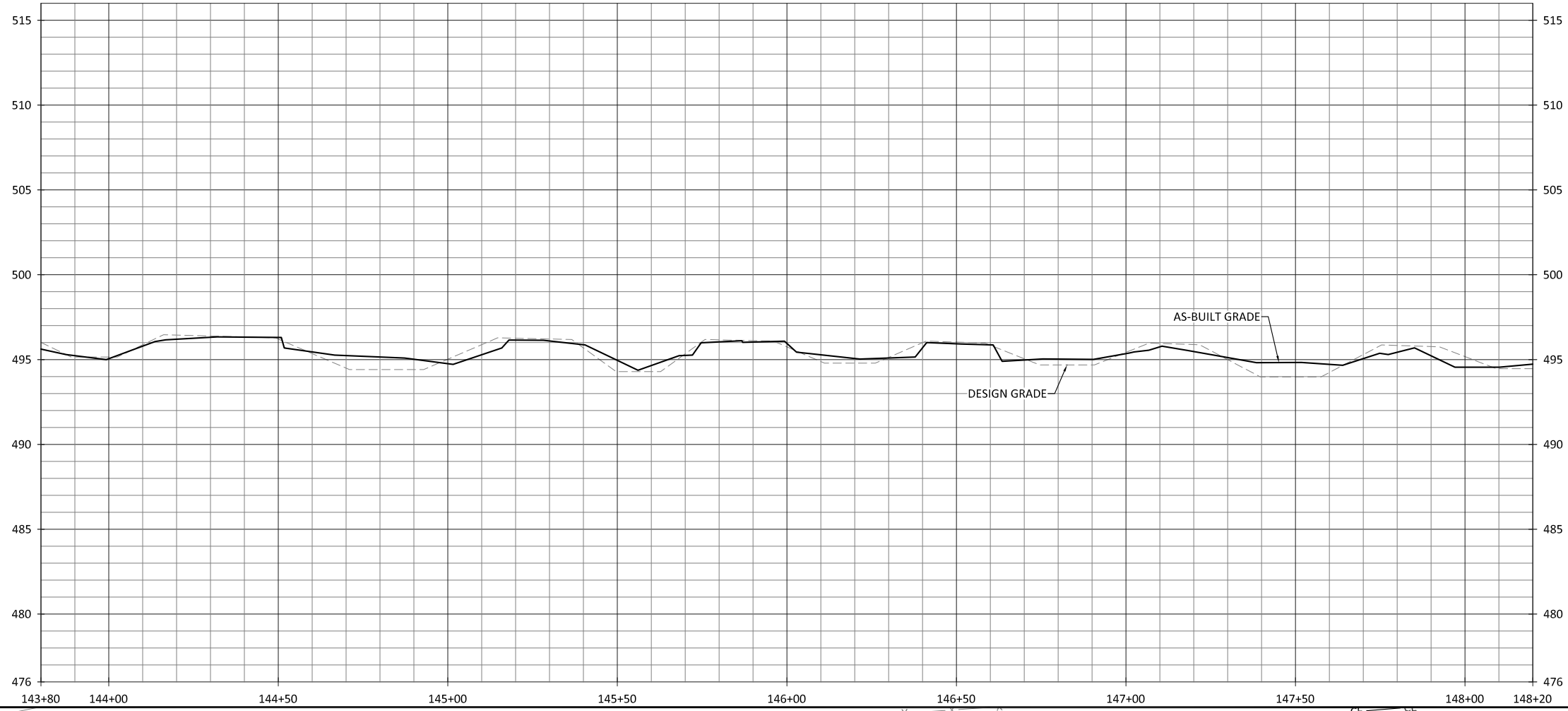
Revisions:

DATE	REVISED	BY	REASON
05/09/22	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE	ANA	RHW

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

1.10

Sheet



NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



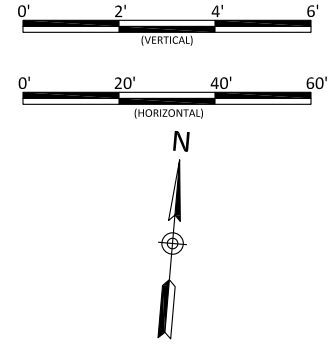
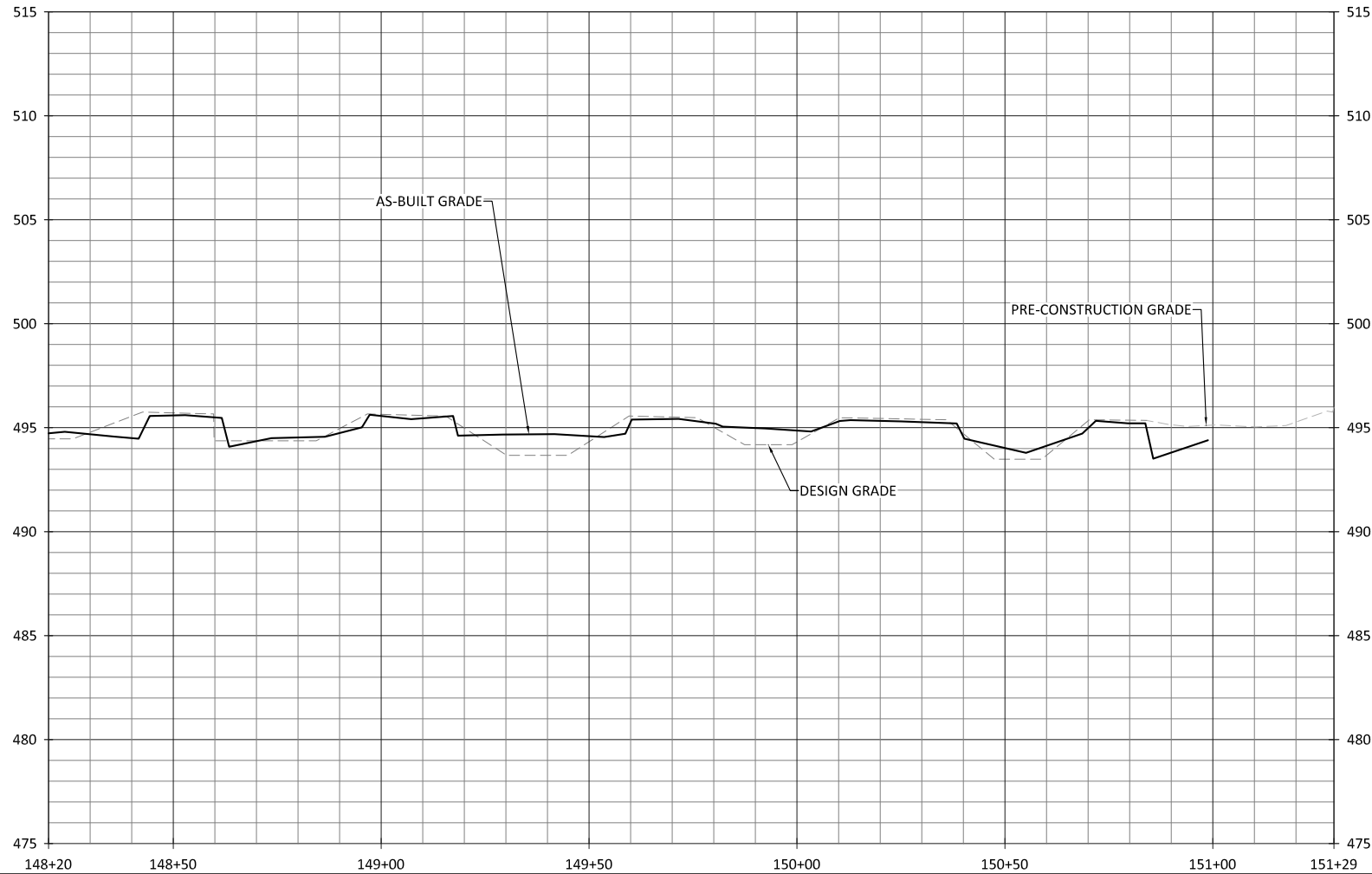
Dynamite Creek Mitigation Site
 Rockingham County, North Carolina

Dynamite Creek
 Stream Plan and Profile

Revisions:
05/09/22 REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

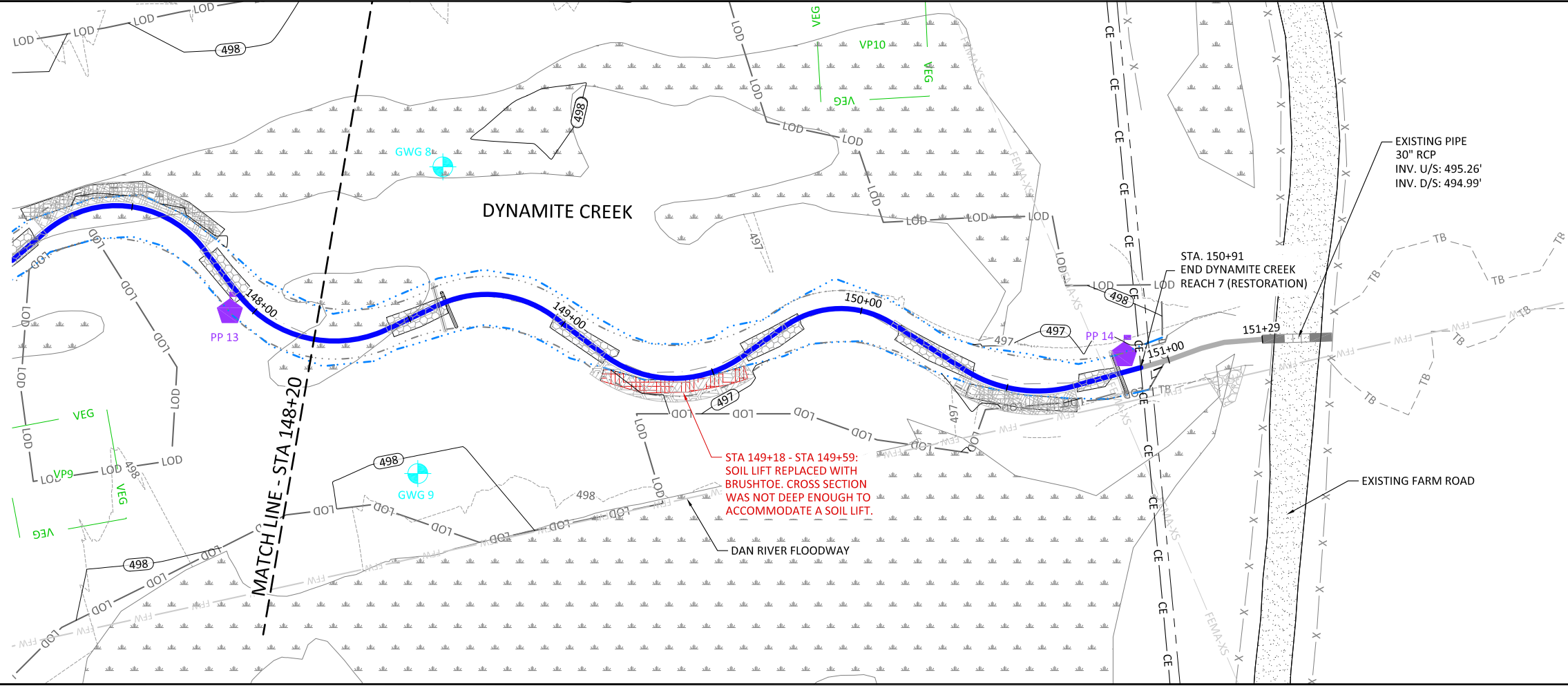
Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

1.11



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Dynamite Creek
Stream Plan and Profile

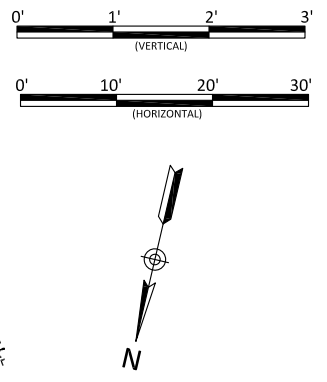
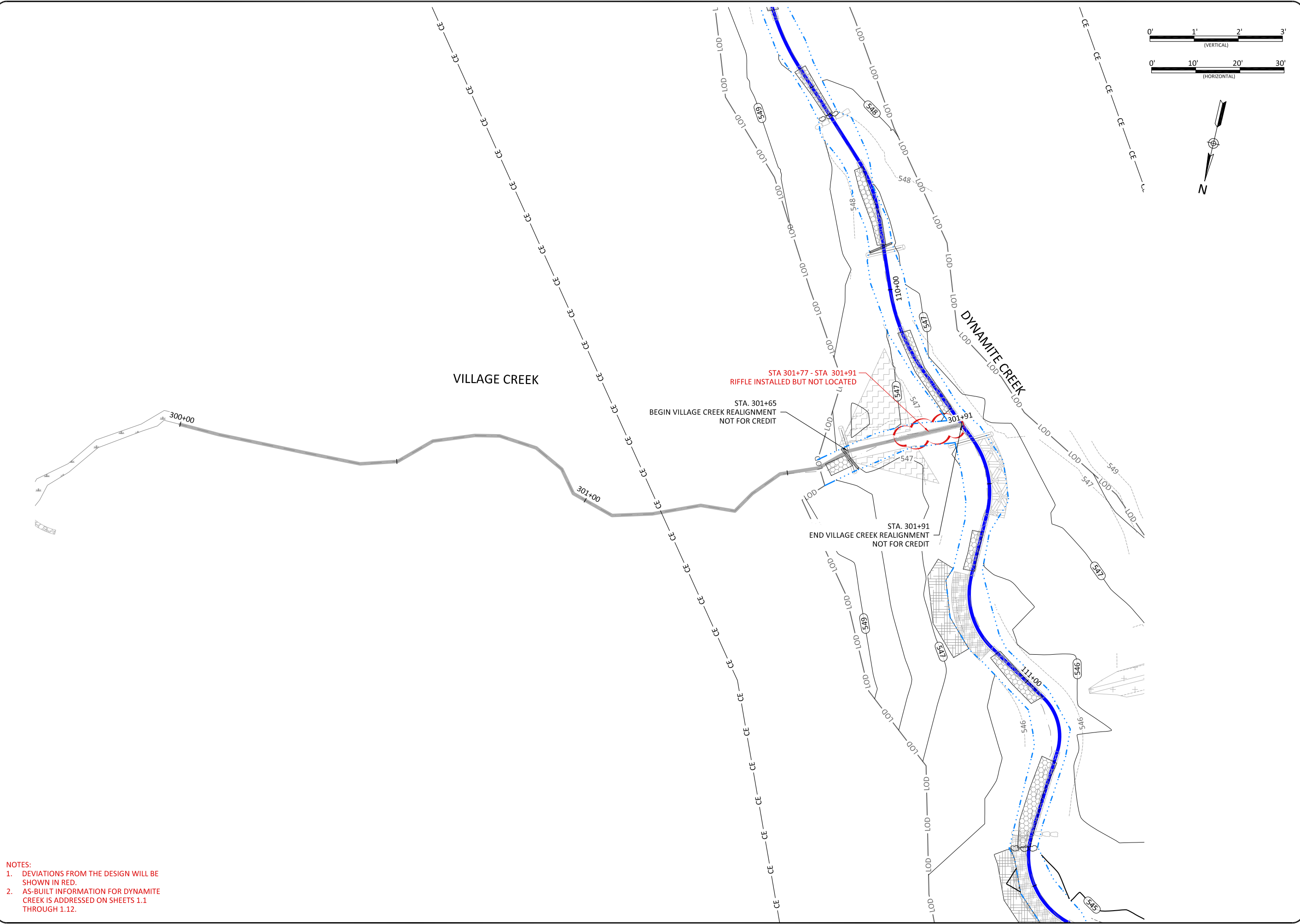


NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

Revisions:
05/09/22 REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

1.12



- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR DYNAMITE CREEK IS ADDRESSED ON SHEETS 1.1 THROUGH 1.12.

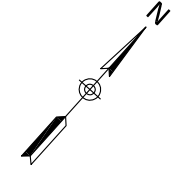
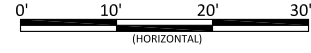
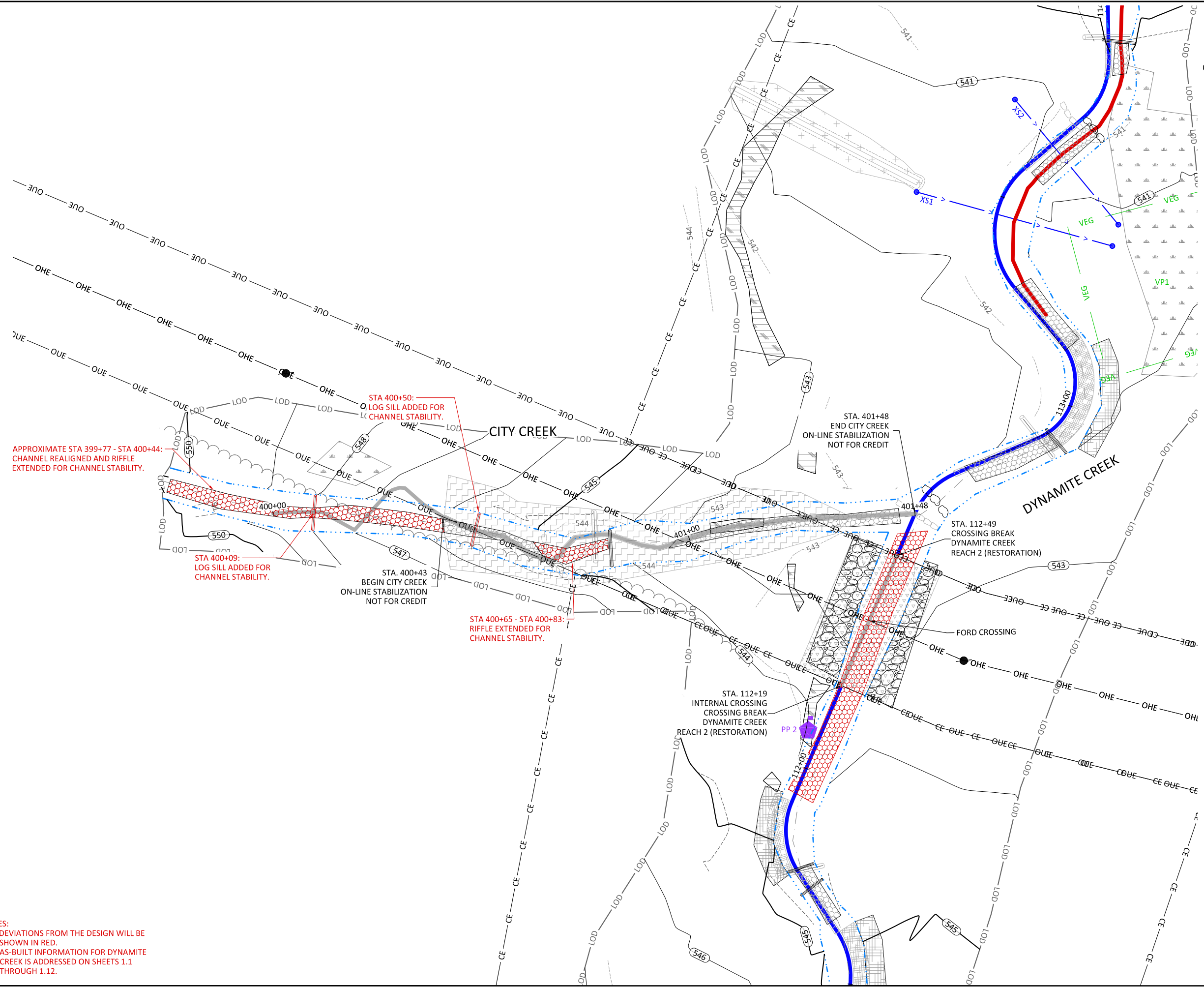


Dynamite Creek Mitigation Site
Rockingham County, North Carolina
 Village Creek - NOT FOR CREDIT
 Stream Plan and Profile

Revisions:

Date	Revised By	Description
05/09/22	ANA	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM



APPROXIMATE STA 399+77 - STA 400+44:
CHANNEL REALIGNED AND RIFFLE
EXTENDED FOR CHANNEL STABILITY.

STA 400+09:
LOG SILL ADDED FOR
CHANNEL STABILITY.

STA 400+50:
LOG SILL ADDED FOR
CHANNEL STABILITY.

STA. 400+43
BEGIN CITY CREEK
ON-LINE STABILIZATION
NOT FOR CREDIT

STA 400+65 - STA 400+83:
RIFFLE EXTENDED FOR
CHANNEL STABILITY.

STA. 401+48
END CITY CREEK
ON-LINE STABILIZATION
NOT FOR CREDIT

STA. 112+49
CROSSING BREAK
DYNAMITE CREEK
REACH 2 (RESTORATION)

STA. 112+19
INTERNAL CROSSING
BREAK
DYNAMITE CREEK
REACH 2 (RESTORATION)

FORD CROSSING

- NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR DYNAMITE CREEK IS ADDRESSED ON SHEETS 1.1 THROUGH 1.12.



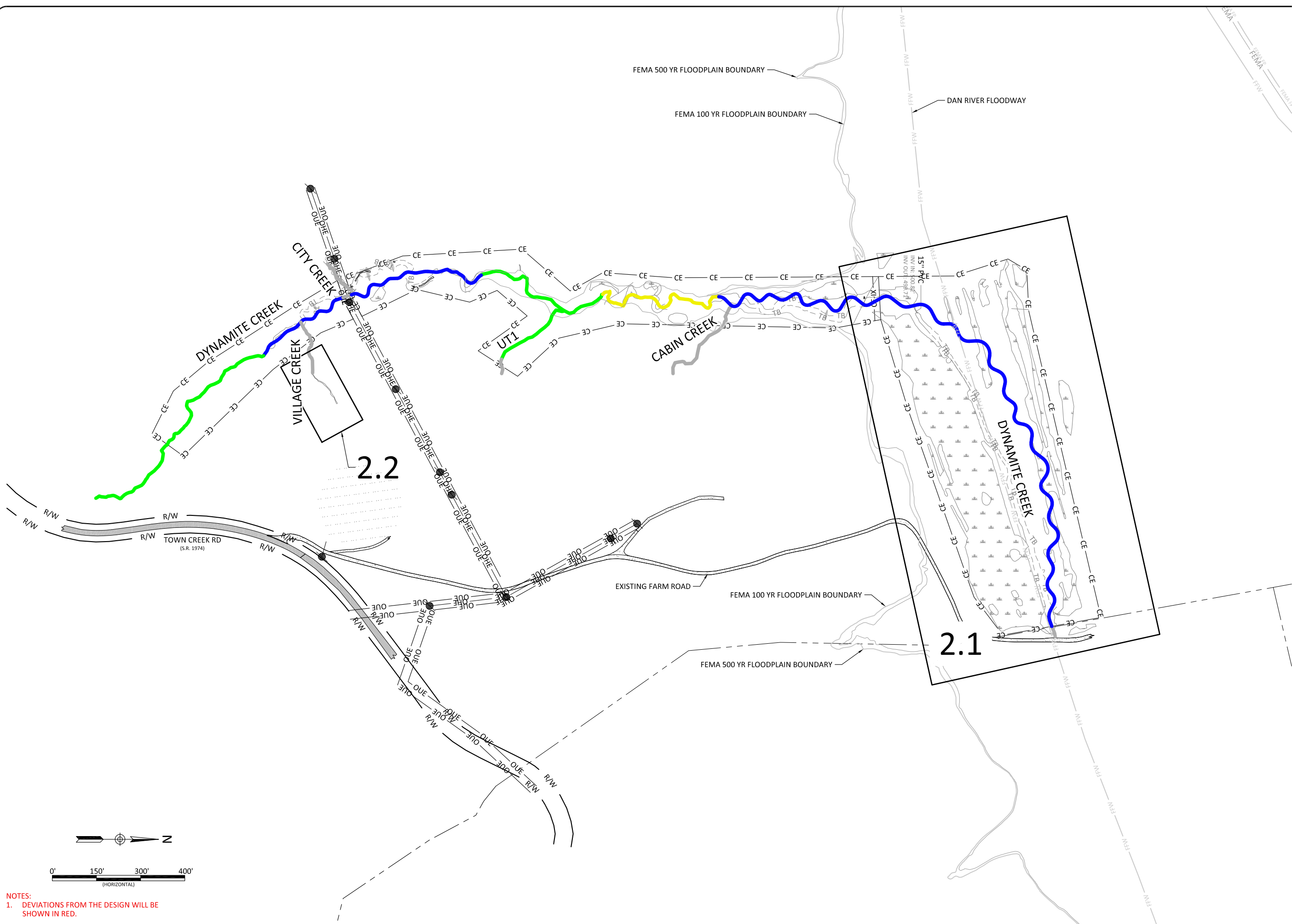
Dynamite Creek Mitigation Site
Rockingham County, North Carolina
City Creek - NOT FOR CREDIT
Stream Plan and Profile

Revisions:

Date	Revised By	Description
05/09/22	ANA	REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

Date:	07/14/21
Job Number:	005-02184
Project Engineer:	ANA
Drawn By:	RHW
Checked By:	NNM

1.14



NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



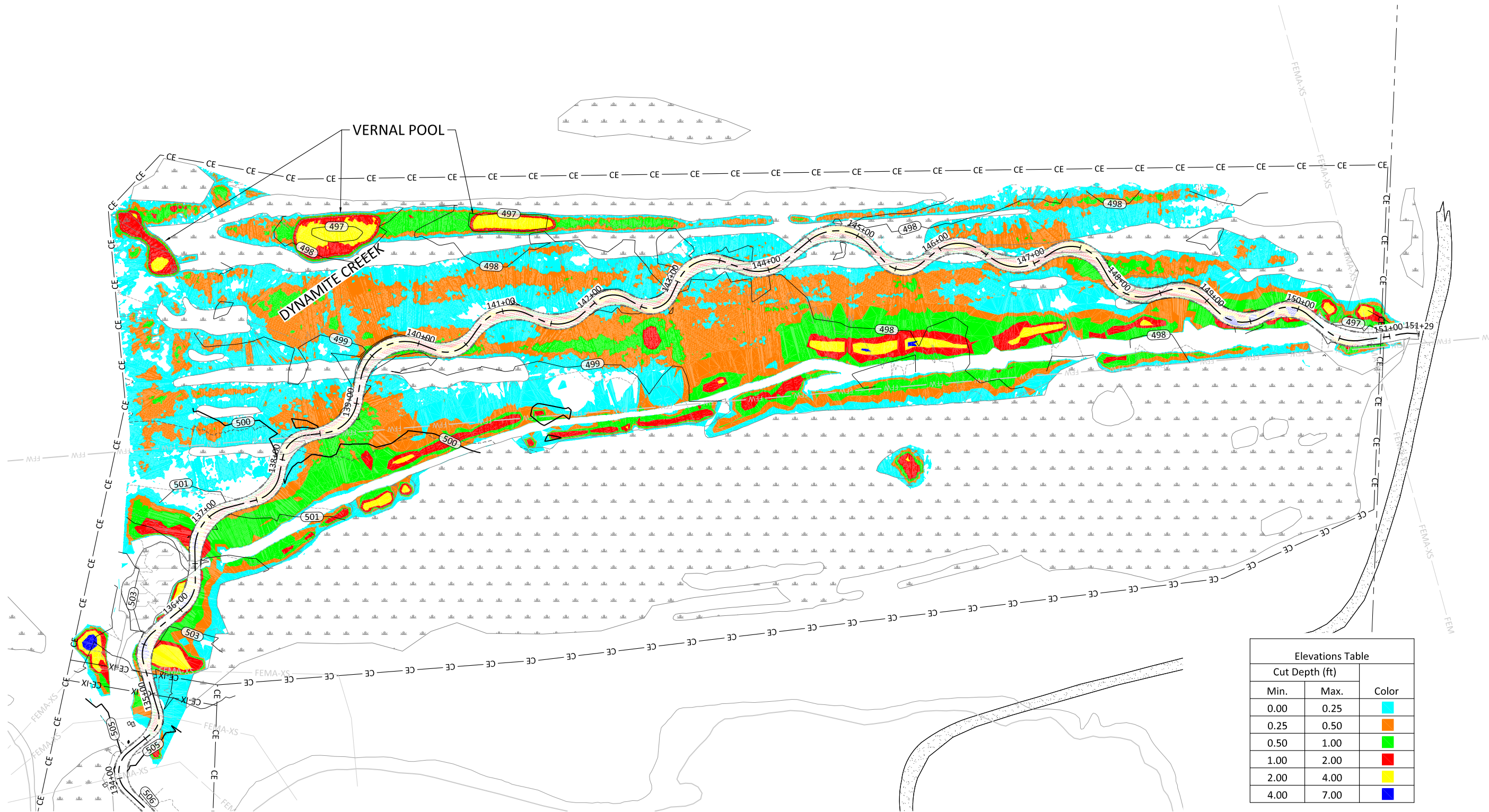
Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Additional Grading Overview

Revisions:

Date: 07/14/21
 Job Number: 005-02184
 Project Engineer: ANA
 Drawn By: RHW
 Checked By: NMM

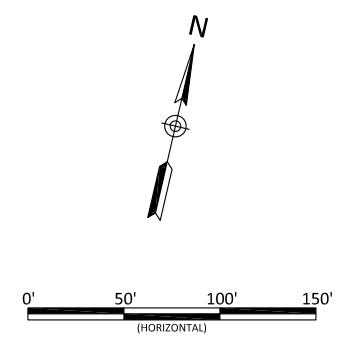
2.0



WETLAND RESTORATION AREA = APPROX. 12.4 AC

- Notes:**
1. No grading is to occur in the existing wetland areas.
 2. Avoid damaging trees in the floodplain. Do not work within the dripline of trees.
 3. Remove and stockpile topsoil from the Wetland Restoration Area in areas of cut greater than 0.5'.
 4. Remove overburden from the Wetland Restoration Area as shown above and as directed by the Engineer in the field.
 5. Reapply top soil to areas of cut greater than 0.5'.
 6. Rip the Wetland Restoration Area to minimum depth of 18" in a direction perpendicular to the proposed channel. Do not rip areas within 10' of the proposed stream channel.
 7. Disc the Wetland Restoration Area, in a direction perpendicular to the proposed channel, until exposed soil masses are less than 4" in diameter.

Elevations Table		
Cut Depth (ft)		
Min.	Max.	Color
0.00	0.25	Light Blue
0.25	0.50	Orange
0.50	1.00	Green
1.00	2.00	Red
2.00	4.00	Yellow
4.00	7.00	Dark Blue

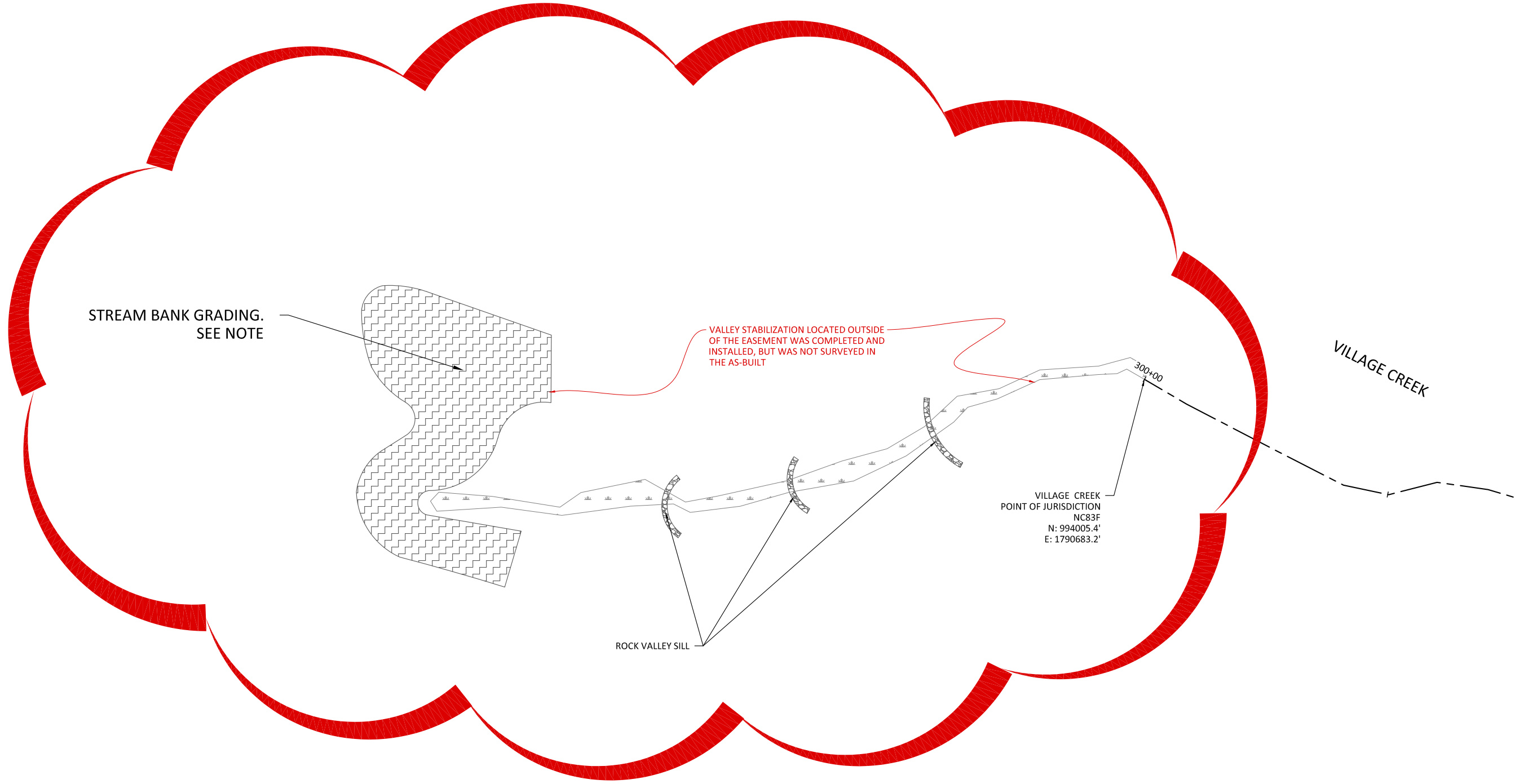


Dynamite Creek Mitigation Site
Rockingham County, North Carolina

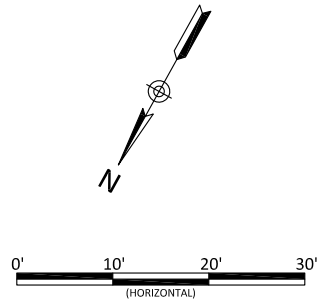
Wetland Grading
Additional Grading

Revisions:
05/09/22 REV 1: ADDRESSED COMMENTS AND UPDATED SURFACE

Date: 07/14/21
Job Number: 005-02184
Project Engineer: ANA
Drawn By: RHW
Checked By: NMM



- Notes:**
1. Grade stream banks to 3(H):1(V) slope where possible. Mat and seed exposed and disturbed areas.
 2. Construct 3 valley sills up-valley of the point of jurisdiction of Village Creek. Valley sills should be made of Class A rip rap material and be 8" tall and 2' wide at the base. Tie sills into existing side slopes.

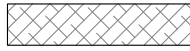


Date: 07/14/21
 Job Number: 005-02184
 Project Engineer: ANA
 Drawn By: RHW
 Checked By: NMM

Revisions:

Dynamite Creek Mitigation Site
 Rockingham County, North Carolina
 Headwaters of Village Creek
 Additional Grading





Buffer Planting Zone (2.22 acres)

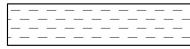
Bare Root						
Species	Common Name	Wetland Rating	Indiv. Spacing	Caliper Size	Stratum	% of Stems
<i>Platanus occidentalis</i>	Sycamore	FACW	6-12 ft.	0.25"-1.0"	Canopy	15%
<i>Quercus rubra</i>	Northern Red Oak	FACU	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Quercus alba</i>	White Oak	FACU	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Betula nigra</i>	River Birch	FACW	6-12 ft.	0.25"-1.0"	Canopy	15%
<i>Celtis laevigata</i>	Sugarberry	FACW	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Ulmus rubra</i>	Slippery Elm	FAC	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Liriodendron tulipifera</i>	Tulip Poplar	FACU	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Diospyros virginiana</i>	Persimmon	FAC	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Acer negundo</i>	Boxelder	FAC	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Oxydendron arboreum</i>	Sourwood	UPL	6-12 ft.	0.25"-1.0"	Subcanopy	5%
<i>Asimina triloba</i>	Pawpaw	FAC	6-12 ft.	0.25"-1.0"	Subcanopy	5%
						100%

Note: Buffer zone species to be planted on 6' spacing in rows spaced 12' apart.



Permanent Seeding Outside Easement (0.25 acres)

Approved Dates	Species Name	Common Name	Wetland Rating	Stratum	Density (lbs/acre)
All Year	<i>Festuca arundinacea</i>	Tall Fescue	FACU	Herb	30
All Year	<i>Dactylis glomerata</i>	Orchardgrass	FACU	Herb	20



Wetland Planting Zone (12.39 acres)

Species	Common Name	Wetland Rating	Indiv. Spacing	Caliper Size	Stratum	% of Stems
Bare Root						
<i>Platanus occidentalis</i>	Sycamore	FACW	6-12 ft.	0.25"-1.0"	Canopy	15%
<i>Ulmus americana</i>	American Elm	FACW	6-12 ft.	0.25"-1.0"	Canopy	40% 9%
<i>Betula nigra</i>	River Birch	FACW	6-12 ft.	0.25"-1.0"	Canopy	15%
<i>Acer negundo</i>	Boxelder	FAC	6-12 ft.	0.25"-1.0"	Canopy	40% 9%
<i>Quercus lyrata</i>	Overcup Oak	OBL	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Quercus michauxii</i>	Swamp Chestnut Oak	FACW	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Ulmus rubra</i>	Slippery Elm	FAC	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Celtis laevigata</i>	Sugarberry	FACW	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Alnus serrulata</i>	Tag Alder	OBL	6-12 ft.	0.25"-1.0"	Subcanopy	5%
Live Stake						
<i>Sambucus canadensis</i>	Elderberry	FACW	6-12 ft.	0.25"-1.0"	Subcanopy	7% 9%
<i>Salix sericea</i>	Silky Willow	OBL	6-12 ft.	0.25"-1.0"	Subcanopy	8% 9%
<i>Salix nigra</i>	Black Willow	OBL	6-12 ft.	0.25"-1.0"	Canopy	40% 9%
						100%

Note: Wetland zone species to be planted on 6' spacing in rows spaced 12' apart.

Streambank Planting Zone 1 - Dynamite Creek Reach 5, 6, 7 (0.66 acres)

Live Stakes						
Species	Common Name	Wetland Rating	Indiv. Spacing	Size	Stratum	% of Stems
<i>Salix nigra</i>	Black Willow	OBL	3-6 ft.	0.5"-1.5" cal.	Shrub	35%
<i>Cornus ammomum</i>	Silky Dogwood	FACW	3-6 ft.	0.5"-1.5" cal.	Shrub	20% 18%
<i>Salix sericea</i>	Silky Willow	OBL	3-6 ft.	0.5"-1.5" cal.	Shrub	25% 29%
<i>Sambucus canadensis</i>	Elderberry	FACW	3-6 ft.	0.5"-1.5" cal.	Shrub	40% 10%
<i>Cephalanthus occidentalis</i>	Buttonbush	OBL	3-6 ft.	0.5"-1.5" cal.	Shrub	40% 8%
						100%
Herbaceous Plugs						
<i>Juncus effusus</i>	Common Rush	FACW	4 ft.	1.0"-2.0" plug	Herb	40%
<i>Carex lurida</i>	Lurid Sedge	OBL	4 ft.	1.0"-2.0" plug	Herb	20%
<i>Carex crinita</i>	Fringed Sedge	OBL	4 ft.	1.0"-2.0" plug	Herb	20%
<i>Scirpus cyperinus</i>	Woolgrass	FACW	4 ft.	1.0"-2.0" plug	Herb	20%
						100%

Streambank Planting Zone 2 - Dynamite Creek Reach 2, 3 (0.14 acres)

Live Stakes						
Species	Common Name	Wetland Rating	Indiv. Spacing	Size	Stratum	% of Stems
<i>Cornus ammomum</i>	Silky Dogwood	FACW	3-6 ft.	0.5"-1.5" cal.	Shrub	30% 33%
<i>Salix sericea</i>	Silky Willow	OBL	3-6 ft.	0.5"-1.5" cal.	Shrub	35% 33%
<i>Sambucus canadensis</i>	Elderberry	FACW	3-6 ft.	0.5"-1.5" cal.	Shrub	20% 24%
<i>Cephalanthus occidentalis</i>	Buttonbush	OBL	3-6 ft.	0.5"-1.5" cal.	Shrub	45% 10%
						100%
Herbaceous Plugs						
<i>Juncus effusus</i>	Common Rush	FACW	4 ft.	1.0"-2.0" plug	Herb	40%
<i>Carex lurida</i>	Lurid Sedge	OBL	4 ft.	1.0"-2.0" plug	Herb	20%
<i>Carex crinita</i>	Fringed Sedge	OBL	4 ft.	1.0"-2.0" plug	Herb	20%
<i>Scirpus cyperinus</i>	Woolgrass	FACW	4 ft.	1.0"-2.0" plug	Herb	20%
						100%

Zone 1 - Streambank Planting
Dynamite Creek Reach 5, 6, 7

Zone 2 - Streambank Planting
Dynamite Creek Reach 2, 3

Zone 3 - Buffer Planting Zone

Zone 4 - Wetland Planting Zone

Zone 5 - Permanent Seeding Outside Easement

Note: Non-hatched areas within easement are vegetated and were planted as needed to achieve target density. Buffer planting occurred within the Limits of Disturbance.

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

Permanent Riparian Seeding (2.71 acres)

Pure Live Seed (20 lbs/acre)					
Approved Dates	Species Name	Common Name	Wetland Rating	Stratum	lbs/acre
All Year	<i>Panicum anceps</i>	Beaked Panicgrass	FAC	Herb	1.0
All Year	<i>Schizachyrium scoparium</i>	Little Bluestem	FACU	Herb	2.0
All Year	<i>Sorghastrum nutans</i>	Indian Grass	FACU	Herb	2.0
All Year	<i>Chasmanthium latifolium</i>	River Oats	FACU	Herb	0.5
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	FACW	Herb	3.0
All Year	<i>Panicum virgatum</i>	Switchgrass	FAC	Herb	1.0
All Year	<i>Tripsacum dactyloides</i>	Eastern Gamagrass	FACW	Herb	1.5
All Year	<i>Panicum clandestinum</i>	Deertongue	FAC	Herb	3.0
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	OBL	Herb	1.0
All Year	<i>Rudbeckia hirta</i>	Blackeyed Susan	FACU	Herb	1.0
All Year	<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	FACU	Herb	1.0
All Year	<i>Bidens aristosa</i>	Bur-marigold	FACW	Herb	1.0
All Year	<i>Chamaecrista fasciculata var. fasciculata</i>	Partridge Pea	FACU	Herb	1.0
All Year	<i>Achillea millefolium</i>	Yarrow	FACU	Herb	0.5
All Year	<i>Juncus tenuis</i>	Path Rush	FAC	Herb	0.5
					20.0






Permanent Wetland Seeding (11.90 acres)

Pure Live Seed (20 lbs/acre)					
Approved Dates	Species Name	Common Name	Wetland Rating	Stratum	Density (lbs/acre)
All Year	<i>Panicum rigidulum</i>	Redtop Panicgrass	FACW	Herb	1.0
All Year	<i>Panicum anceps</i>	Beaked Panicgrass	FAC	Herb	2.4
All Year	<i>Agrostis hyemalis</i>	Winter Bentgrass	FAC	Herb	1.0
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	FACW	Herb	2.0
All Year	<i>Panicum virgatum</i>	Switchgrass	FAC	Herb	1.0
All Year	<i>Tripsacum dactyloides</i>	Eastern Gamagrass	FACW	Herb	1.4
All Year	<i>Panicum clandestinum</i>	Deertongue	FAC	Herb	3.0
All Year	<i>Carex lurida</i>	Lurid Sedge	OBL	Herb	0.4
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	OBL	Herb	2.5
All Year	<i>Carex lupulina</i>	Hop Sedge	OBL	Herb	0.4
All Year	<i>Juncus effusus</i>	Common Rush	FACW	Herb	1.0
All Year	<i>Carex frankii</i>	Frank's Sedge	OBL	Herb	1.0
All Year	<i>Peltandra virginica</i>	Arrow Arum	OBL	Herb	1.0
All Year	<i>Cephalanthus occidentalis</i>	Buttonbush	OBL	Shrub	0.5
All Year	<i>Bidens aristosa</i>	Bur-Marigold	FACW	Herb	1.4
					20.0

Temporary Seeding (14.86 acres)

Pure Live Seed					
Approved Dates	Species Name	Common Name	Wetland Rating	Stratum	Density (lbs/acre)
Aug 15 - May 1	<i>Secale cereale</i>	Rye Grain		Herb	110
May 1 - Aug 15	<i>Setaria italica</i>	German Millet	FACU	Herb	50
Aug 15 - May 1	<i>Avena sativa</i>	Winter Oats	UPL	Herb	30
All Year	<i>Trifolium repens</i>	Ladino Clover	FACU	Herb	5
All Year	<i>Trifolium incarnatum</i>	Crimson Clover		Herb	5



-  Zone 1 - Streambank Planting
Dynamite Creek Reach 5, 6, 7
-  Zone 2 - Streambank Planting
Dynamite Creek Reach 2, 3
-  Zone 3 - Buffer Planting Zone
-  Zone 4 - Wetland Planting Zone
-  Zone 5 - Permanent Seeding Outside Easement

Note: Non-hatched areas within easement are vegetated and were planted as needed to achieve target density. Buffer planting occurred within the Limits of Disturbance.



- NOTES:**
- DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



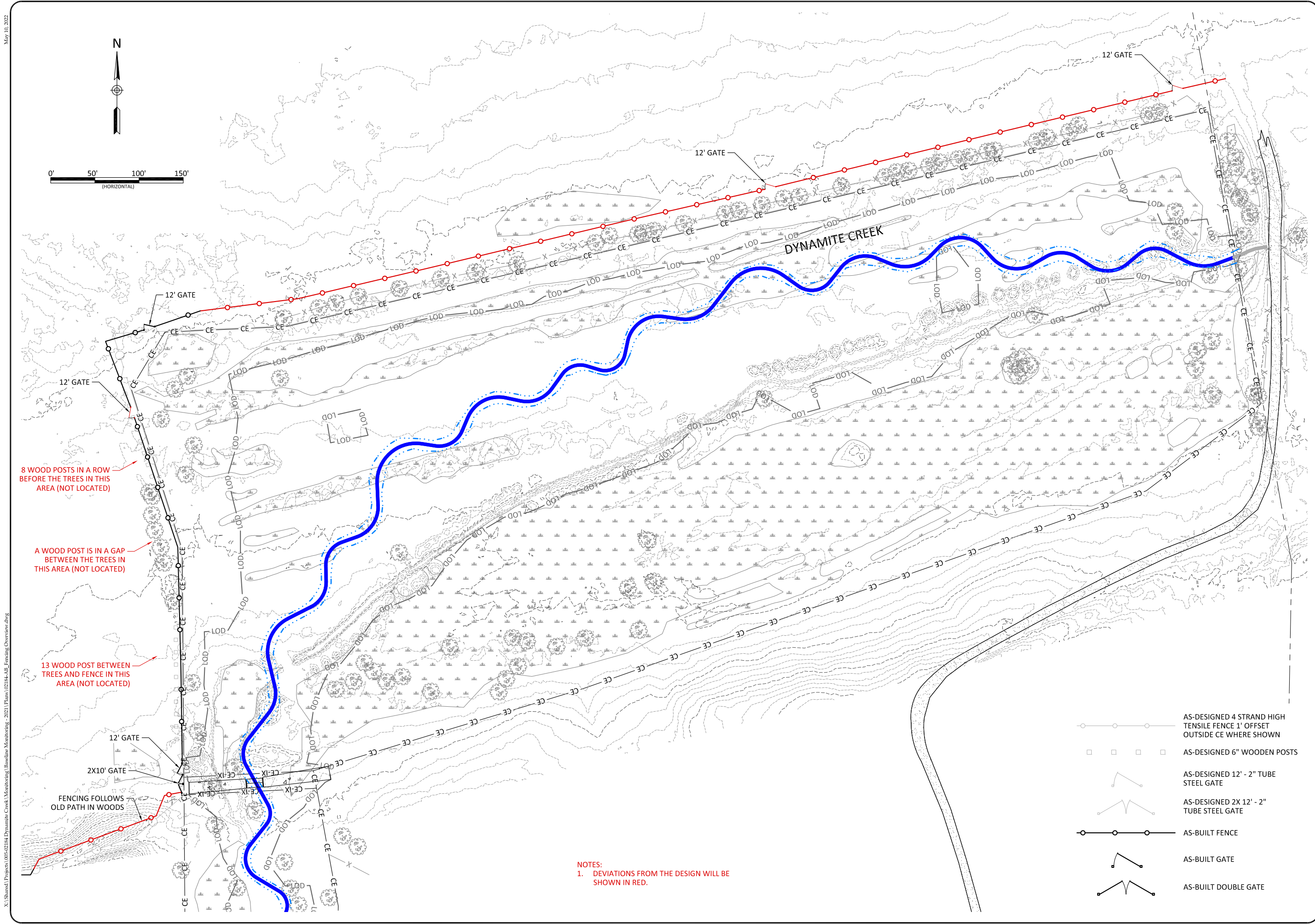
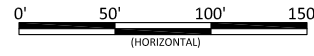
Dynamite Creek Mitigation Site
Rockingham County, North Carolina

Planting Overview

Revisions:

Date: 07/14/21
Job Number: 005-02184
Project Engineer: ANA
Drawn By: RHW
Checked By: NMM

3.1



8 WOOD POSTS IN A ROW BEFORE THE TREES IN THIS AREA (NOT LOCATED)

A WOOD POST IS IN A GAP BETWEEN THE TREES IN THIS AREA (NOT LOCATED)

13 WOOD POST BETWEEN TREES AND FENCE IN THIS AREA (NOT LOCATED)

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

- AS-DESIGNED 4 STRAND HIGH TENSILE FENCE 1' OFFSET OUTSIDE CE WHERE SHOWN
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Dynamite Creek Mitigation Site Rockingham County, North Carolina

DMS Fencing





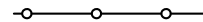


Revisions:

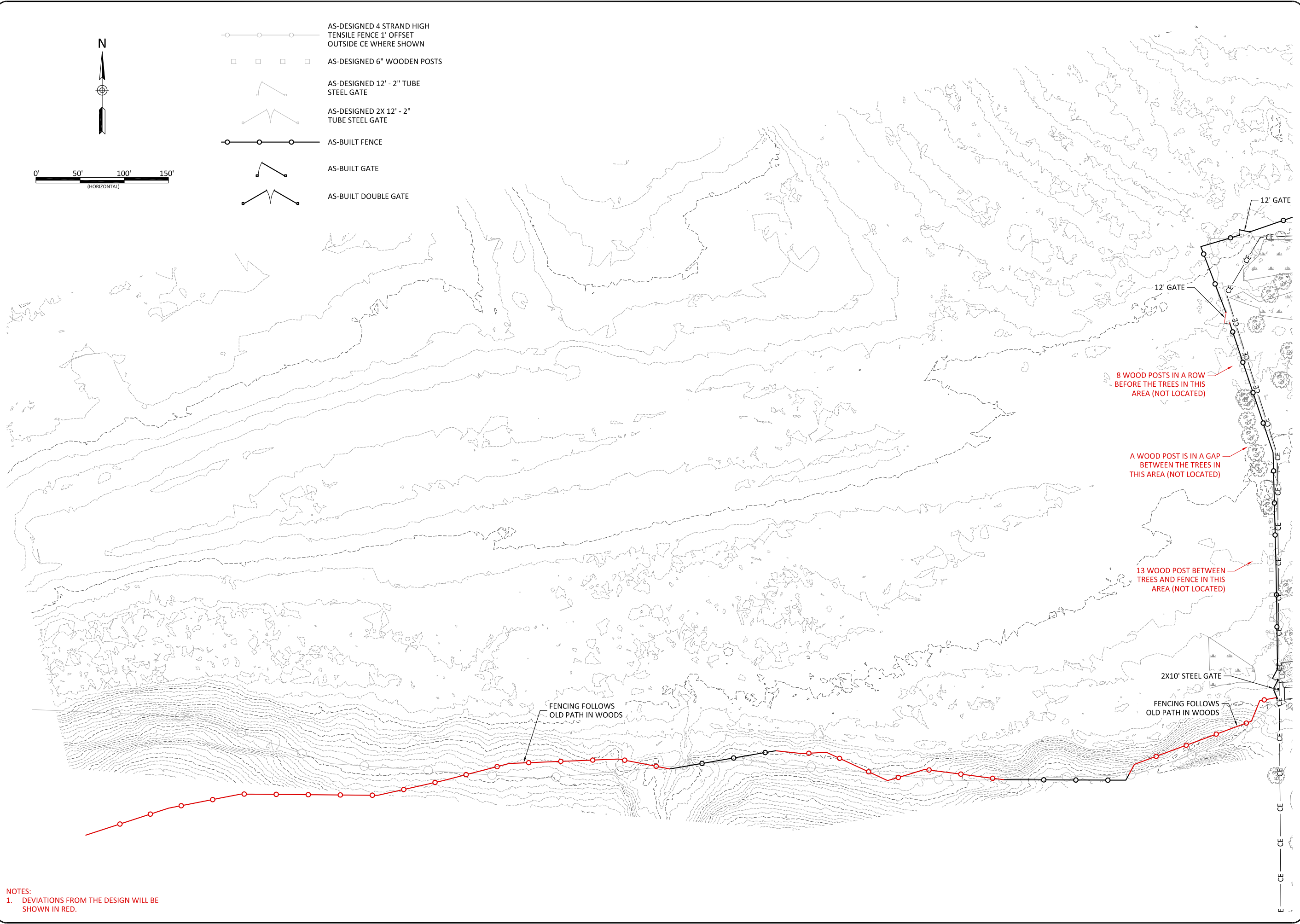
Date: 07/14/21
 Job Number: 005-02184
 Project Engineer: ANA
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 Checked By: NNM

4.0





-  AS-DESIGNED 4 STRAND HIGH TENSILE FENCE 1' OFFSET OUTSIDE CE WHERE SHOWN
-  AS-DESIGNED 6" WOODEN POSTS
-  AS-DESIGNED 12' - 2" TUBE STEEL GATE
-  AS-DESIGNED 2X 12' - 2" TUBE STEEL GATE
-  AS-BUILT FENCE
-  AS-BUILT GATE
-  AS-BUILT DOUBLE GATE



NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.



Dynamite Creek Mitigation Site
Rockingham County, North Carolina

EQUIP Fencing

Revisions:

Date: 07/14/21
 Job Number: 005-02184
 Project Engineer: ANA
 Drawn By: RHW
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4.1